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AN EXPLORATION OF HOW AND WHY PRIMARY CARE PROVIDERS  
EDUCATE INFANT CAREGIVERS ABOUT POSITIONING

A thesis submitted in partial fulfillment of the requirements for the degree of Master of  
Science at Virginia Commonwealth University

by

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## ABSTRACT

### AN EXPLORATION OF HOW AND WHY PRIMARY CARE PROVIDERS EDUCATE INFANT CAREGIVERS ABOUT POSITIONING

By Amy Greenspon Choffin, OTR/L

A thesis submitted in partial fulfillment of the requirements for the degree of Master of  
Science at Virginia Commonwealth University.

Virginia Commonwealth University, 2006

Major Director: Dr. Shelly J. Lane, PhD, OTR/L FAOTA  
Chair, Department of Occupational Therapy

A review of the literature indicates that how infants are positioned is related to the risk of  
SIDS, the incidence and severity of plagiocephaly, torticollis, and developmental delays.

A quantitative approach with survey methodology was used with 66 pediatric primary  
care providers responding to 26 questions. Overall, PCPs are educating caregivers about  
sleep positioning with a high frequency. There was a relationship between practice site,  
and the frequency of sleep positioning education is provided. While the participants  
provide education about awake positioning, and the use of positioning devices, it was  
with less frequency than they do about sleep positioning; there is limited education and  
awareness surrounding issues related to infants' prolonged use positioning devices among  
PCPs in this study. This information indicates there is room for further study of the long-

term effects upon child development of extensive supine positioning, as well as potential areas for occupational therapy intervention in the area of preventative education.

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## CHAPTER I: INTRODUCTION

Infant development is influenced by parental beliefs and knowledge, and the information new parents gain from a multitude of sources in their environments. Primary care providers (PCPs) (pediatricians, family practice physicians, nurse practitioners [NP], and/or physician assistants [PA]) are in a unique position to influence parental beliefs; new parents look to them as the source of information for issues ranging from feeding, bathing, nail care and diaper rash to vaccinations and positioning. This study focused on recommendations made to new parents about infant positioning. The impetus for this query was the increasing incidence of plagiocephaly, or head deformation, and/or associated torticollis, and its potential relationship to recommendations made by PCPs regarding positioning for both sleep and awake time. There may also be a link between positioning and motor skill development in infants.

There are several factors that may influence PCP recommendations for positioning, the most significant of which was the initiation of positioning education for SIDS prevention; in 1992, the American Academy of Pediatrics announced recommendations for positioning healthy infants in supine or side lying for sleep. In 1994, the official SIDS “Back to Sleep” campaign was initiated to educate the public and health care providers about positioning recommendations, officially recommending back

or side lying for sleep. In 2005, the recommendations were amended for back sleep positioning only. The Back to Sleep campaign, advocates for positioning infants in supine as one of the ways to prevent SIDS. While it has had the very positive outcome of a significant reduction in the incidence of SIDS, the recommendations from this campaign may have been so broadly interpreted as to suggest that prone positioning should never be used. The excessive use of supine positioning for both sleep and awake times may result in plagiocephaly and/or torticollis. Both of these outcomes have the potential to interfere with typical motor development. The current study was designed to gain a better understanding of positioning recommendations made by PCPs.

#### Statement of the Problem

There is reason to believe that how infants are positioned during sleep and awake time may influence developmental skill achievement (Davis, Moon, Sachs, & Ottolini, 1998; Dewey, Fleming, Golding, & the ALSPAC Study Team, 1998; Jantz, Blosser, & Freuchting, 1997; Miller & Clarren, 2000; Ratliff-Schaub, Hunt, Crowell, Golub, Smok-Pearsall, Palmer et al., 2001; Salls, Silverman, & Gatty, 2002), head shape (Argenta, David, Wilson, & Bell, 1996; Cranial Technologies, Inc., retrieved April 22, 2004 from <http://www.cranialtech.com/>; Dube & Flake, 2003; Hunt & Puczyniski, 1996; Kane, Mitchell, Craven, & Marsh, 1996; Littlefield, Kelly, Reiff, & Pomatto, 2003; Turk, McCarthy, Thorne, & Wisoff, 1996), torticollis (Littlefield et al., 2003), and the incidence of Sudden Infant Death Syndrome (SIDS) (The American Academy of Pediatrics, 2000; Delzell, Phillips, Schitzer, & Ewigman, 2001; Fleming, Blair, Bacon, Bensley, Smith, Taylor, Berry, Golding, & Tripp, 1996; Lockridge, Taquino, & Knight,

1999). There is also reason to believe that there is inconsistency in how and why PCPs educate caregivers about positioning their infants for sleep and play (Pollack & Frohna, 2002; Ray, Metcalf, Franco, & Mitchell, 1997).

There are several health care issues that relate to infant positioning. Adams, Kugener, Mimiran, and Ariagno (1998) report inconsistencies in education and compliance with Back to Sleep recommendations in some populations, which may put these infants at a higher risk for SIDS. At the same time, it seems as though there may be a lack of education about benefits of supervised prone positioning of infants with caregivers. There are caregivers of infants that avoid prone positioning altogether, or are not providing a substantial amount of supervised prone positioning during infants' awake time in an effort to be compliant with the SIDS prevention recommendations (Mildred, Beard, Dallwitz, & Unwin, 1995). It is also possible that a significant lack of or decrease in prone positioning or excessive positioning in devices of infants may have negative implications for motor skill achievement (Davis, Moon, Sachs, & Ottolini, 1998; Hunt & Puczynski, 1996; ). An excess of supine positioning, and the use of positioning devices that maintain the infant in supine, may have a potentially harmful impact on skull formation, as in plagiocephaly, (Hutchinson, Thompson, & Mitchell, 2003; Littlefield, Kelly, Reiff, & Pomatto, 2003) and neck muscles (as in torticollis) (Littlefield, Reiff, & Rekate, 2000). Studies that describe these infant positioning-related issues will be discussed in the literature review section of this proposal.

## Background of the Problem

“SIDS is a disease of unknown cause (American Academy of Pediatrics [AAP], 2000, p. 650)”. It is the leading cause of death in infants under 1 year of age, with the risk of SIDS peaking between 2 and 4 months of age and then declining. In an effort to decrease the incidence of insidious, idiopathic SIDS, recommendations have been made about infant positioning by the AAP (2000, 2005). Until recently, positioning recommendations were made for non-prone sleep positioning. Non-prone sleep included positioning for supine sleep, although side lying was thought to be an acceptable, while at the same time, less stable (than supine) alternative. As of October 2005, the new American Academy of Pediatrics (AAP) recommendations state that supine for sleep is the positioning that should be recommended by PCPs to prevent SIDS (The American Academy of Pediatrics Task Force on Infant Sleep Position and Sudden Infant Death Syndrome Policy Statement, 2005).

Pediatric PCPs have been educating caregivers of newborns about the recommendations of the Back to Sleep campaign since it began. An American Academy of Pediatrics Task Force on Infant Sleep Position and Sudden Infant Death Syndrome publication (2005) reported over a 53% decrease in the SIDS rate from 1992, just prior to implementation of the sleep positioning recommendations to 2001, almost 10 years later. This report provides information that is suggestive of the powerful potential of preventative education. In summary, the two main messages of the campaign are to place infants on their backs to sleep, and to not have any soft objects or surfaces near sleeping babies. While the declining SIDS rate that coincides with the Back to Sleep campaign is



remarkable, there are suggestions that there also may be a linear relationship to the Back to Sleep campaign and the incidence of plagiocephaly, with and without torticollis (Littlefield, Kelly, Pomatto, & Beals, 1999; Peitsch, Keefer, LaBrie, & Mulliken, 2002), and an increased potential for developmental delays (Davis, Moon, Sachs, & Ottolini, 1998).

Some investigators believe that prevention of acquired torticollis and plagiocephaly is possible, and is a more important issue than early recognition (Biggs, 2003; Persing, James, Swanson, Kattwinkel, Committee on Practice and Ambulatory Medicine, Section on Plastic Surgery, & Section on Neurological Surgery, 2003). In 2000, and reinforced again in October 2005, the American Academy of Pediatrics released a policy statement with the following recommendation for alternative infant positioning:

A certain amount of tummy time while the infant is awake and observed is recommended for developmental reasons and to help prevent flat spots on the occiput. Positional plagiocephaly also can be avoided by altering the supine head position during sleep. Techniques for accomplishing this include placing the infant to sleep with the head to 1 side for a week or so and then changing to the other and periodically changing the orientation of the infant to outside activity (eg. the door of the room) (AAP task force on Infant Sleep Position and SIDS, pp. 653-654).

This statement by the AAP is consistent with the recognition by Persing et al. (2003): there has been a significant rise in the incidence of plagiocephaly since the SIDS campaign; occurring despite the fact that tummy time is mentioned in the list of positioning recommendations to help prevent SIDS. Personal communications with two family practice physicians in Charlotte, North Carolina revealed great inconsistencies in

how, and why they educate caregivers of newborns about positioning of infants while they are awake, such as in supervised prone for play positioning. Excerpts from these communications can be found on the “What is being done about tummy time?” section.

In response to concerns about plagiocephaly, the 2005 AAP release introduced earlier in this proposal encouraged supervised prone positioning of infants to prevent plagiocephaly, and to promote motor skills. This new policy also recommended that the amount of time infants spend in car seats and bouncy seats should be limited.

Quantification of how much prone positioning per day is recommended is not specified, nor is how much time is acceptable to place an infant in a car seat or bouncy seat. The policy also recommended that supine head position should be altered frequently (The American Academy of Pediatrics Task Force on Infant Sleep Position and Sudden Infant Death Syndrome Policy Statement, 2005).

Occupational therapists may be key players for implementing preventative education for caregivers of infants. Occupational therapists are trained to get a bird’s eye view of situations and contexts; to be able to understand cause-and-effect of disease and disability when it exists, as well as ability and inability in daily living; and to execute treatment and prevention programs based on this knowledge for optimal functioning in daily living with clients of all ages. This training provides clinicians with the tools to make insightful decisions about intervention and prevention. There are many potential contextual influences that may influence the choices that caregivers make for positioning which will be explored in the literature review. A discussion of how the education that caregivers of infants receive may impact their occupation as infant caregivers is

warranted. The impact of how infant caregivers receive positioning education would in turn impact the growing infants' occupations as well since the children may not receive the same types of environmental input and stimulation if a parent avoids alternative positioning for play. Occupational therapists currently assess and treat infants who demonstrate motor skills delays, torticollis, and plagiocephaly. This puts occupational therapists in an ideal position to contribute to efforts made at prevention of these conditions in cases that result directly or indirectly from a lack of supervised prone positioning, or excessive supine positioning.

#### Importance of Research

The intent of this study was to explore how and why PCPs provide education to infants' caregivers about positioning with their infants. This initial exploration will contribute to the development of a better understanding about the relationship between choices made for how infants are positioned for activities throughout the day, and infant development. Infant positioning has been linked to the etiologies of plagiocephaly and torticollis, and motor skill delays. This research could be a first step in the future identification of roles for occupational therapists in the prevention of plagiocephaly, torticollis, or motor skill delays that may be linked to infant positioning.

## CHAPTER II: LITERATURE REVIEW

The positioning of infants for sleep and supervised play may have significant implications for the health and well being of the newborn. There seems to be a relationship between supine positioning of newborns for sleep and a declining SIDS rate. Furthermore, anecdotal clinical evidence suggests that there is potential for a relationship to exist between how infants are positioned, and the development of motor skills, and head shape.

It is probable that how caregivers of newborns are educated about positioning their babies, and how the caregivers perceive their education about positioning may have an impact on how the babies are positioned in the home environment. The purpose of this literature review is to explore what is known about the incidence and etiology of conditions that seem related to infant positioning. These conditions include: the incidence of SIDS in relation to positioning of newborns, and the incidence and etiology of plagiocephaly and torticollis. This review of the literature will also explore potential relationships between positioning of newborns and motor skill development. A discussion of how these positioning-related issues may relate to occupational therapy for prevention will be discussed.

## SIDS and Positioning

“SIDS is a disease of unknown cause (American Academy of Pediatrics, 2000, p. 650)”. It is the leading cause of death in infants under 1 year of age with the risk of SIDS peaking between 2 and 4 months of age, and then declining. There are several studies that identify independent risk factors for SIDS: prone sleeping position, sleeping on a soft surface, maternal smoking during pregnancy, overheating, late or lack of prenatal care, young maternal age, prematurity and/or low birth weight, and male sex (The American Academy of Pediatrics Task Force on Infant Sleep Position and Sudden Infant Death Syndrome [AAP Task Force], 2000; Fleming et al., 1996). In support of prone sleeping being a risk factor for SIDS, SIDS rates are low in cultures in which prone sleeping in infants is rare (AAP, 2000). Nelson, Yu, Wong, D., Wong, H. Y. E., and Yim (2004) stated that Hong Kong Chinese infants have a historically low SIDS rate, and are known to sleep supine. The authors did not offer specific statistics to support this statement. As a result of prone sleeping being listed as both a major independent risk factor, and a risk factor with great potential for modification (Stastny, Ichinose, Thayer, Olson, & Keens, 2004; Willinger, Hoffman, Wu, Hou, Kessler, Ward et al., 1998), several agencies have supported the SIDS prevention Back to Sleep prevention campaign. In an effort to decrease the incidence of insidious, idiopathic SIDS, recommendations have been made about infant positioning.

The task force on infant positioning and SIDS reports that in April 1992 the American Academy of Pediatrics (AAP) released a statement about the positioning of healthy infants: place infants on their back or side to sleep. The official “Back to Sleep”

SIDS prevention campaign was formally launched in 1994, and positioning recommendations from 1992 were reaffirmed. Furthermore, additional recommendations were added: infants should be placed on firm surfaces for sleep, and all soft toys and blankets should be kept out of a sleeping infants' environment (American Academy of Pediatrics Task Force on Infant Sleep Position and Sudden Infant Death Syndrome [AAP Task Force], 2000). The AAP and agencies such as the Centers for Disease Control and Prevention (CDC), The National Institute of Child Health and Human Development (NICHD), the Maternal and Child Health Bureau, and the Census Bureau supported these statements, which marked the beginning of the United States national campaign to prevent SIDS (Media Advisory SIDS Alliance, 2001). As discussed by Sanderson, Lohman, and Bramble (2003), federal agencies have responsibilities to public health. Since 1992, NICHD has supported the SIDS prevention campaign by funding surveys that have shown prone sleeping continues to decrease significantly for infants in the United States (retrieved from NICHD website on September 24, 2005 at <http://156.40.88.3/publications/pubs/ppb/sub8.htm>). One major responsibility of the CDC is federal epidemiological research (Sanderson et al., 2003). The CDC's support of the campaign suggests there was substantive evidence to recommend side or back sleeping to prevent SIDS.

Overall, placement on the back (supine) was seen as preferable to side lying because "the supine position has been shown to be the most stable and safest position in which to have infants sleep (Colson, Bergman, Shapiro, & Leventhal, 2001, p. 250)". While side lying was seen as still statistically safer than prone, it is a more difficult

position to maintain and there is a higher chance that an infant in side lying could roll over into prone (Colson et al., 2001; Hein & Pettit, 2001). As of October 10, 2005, the AAP released a revision of its policy, indicating that full supine sleep positioning should be the only sleep positioning recommendation (AAP Task Force, 2005).

At this time it appears that this bold approach has been successful in the prevention of SIDS. From 1992 to when the 2000 AAP Task Force article was written, the frequency of prone sleeping decreased from over 70% to approximately 20% in the United States. During the same time period, the SIDS rate decreased by approximately 40% (Media Advisory SIDS Alliance, 2001). The new AAP Task Policy Statement (2005) states that the SIDS rate may have decreased even more than 40%, possibly as much as 53% over almost 10 years, from 1992 to 2001.

Willinger, Hoffman, et al. (1998) reported similar results in an annual, nationally represented, phone survey. These investigators conducted approximately 1,000 interviews with nighttime caregivers of infants between 1992 and 1996. Results indicated that infants were placed in prone for sleep by 70% of caregivers prior to the SIDS prevention campaign, while only 24% placed their babies in prone in the 1996 survey after the Back to Sleep campaign had been implemented. The authors reported the SIDS rate dropped 38% during this time while maintaining that “causality cannot be proven (p. 329-325)” although the factors appear to be linked.

There has been tremendous education and follow through with the SIDS Back to Sleep campaign. However, addressing public health issues is very complex. Recommendations made to impact one problematic outcome come with a potential to

create other undesirable effects. The potential relationships between a significant decrease in prone positioning of infants, and the increasing incidence of plagiocephaly (Habal, Leimkuehler, Chambers, Scheuerle, & Guilford, 2003), torticollis, and the potential for developmental delays appear to be examples of this effect (Kane, Mitchell, Craven, & Marsh, 1996; Jantz, Blosser, & Freuchting, 1997; Miller & Clarren, 2000). An overview of infant positioning trends is warranted before exploring these specific negative conditions that may relate to infant positioning.

### Infant Positioning

While there has been a tremendous decrease in the incidence of prone sleep positioning in infants since the implementation of the SIDS prevention campaign, there are still parents that position their babies in prone for sleep (Colson, Bergman, Shapiro, & Leventhal, 2001; Pollack & Frohna, 2002; Willinger, Ko, Hoffman, Kessler, & Corwin, 2000). The idea that there are parents that continue to choose to place their infants in prone for sleep in light of the apparent increased risk for SIDS is cause for concern. Adams, Kugener, Mimiran, and Ariagno (1998) mailed questionnaires to the mothers of 177 healthy preterm infants following hospital discharge. The demographics of the participants were as follows:

- Almost half (45%) of the participants were White
- 33% were Hispanic
- 10% were African American
- 9% were Asian/Pacific Islander (Adams, et al., 1998, p. 170).



The investigators reported that the highest response rates were in the White and Asian/Pacific Islander groups, and that only 40% of Hispanic and African American families responded. The questionnaire addressed sleep positioning of the newborns. These investigators reported that there were no standardized instructions provided for recommended sleep positioning issued upon the infant's discharge from the hospital, and that sleep position is typically discussed during the infants' hospitalization. They also noted that sometimes prone positioning may be recommended for the infants by the nursing staff. However, they did not go into detail about why this type of education was indicated for healthy, preterm infants in light of the Back to Sleep recommendations. They did note that there was greater compliance with prone positioning recommendations with caregivers that were given instructions for prone positioning of their infants upon discharge from the hospital (83% compliance), in comparison to caregivers of infants that were given instructions for non-prone positioning (35% compliance). Non-prone positioning was described as either supine or side lying positioning. Furthermore, the parents who were educated about non-prone positioning recommendations, but chose prone positioning for their healthy preterm infants reported that their infants seemed to sleep better and longer while in prone. Another investigation by Hunt, Fleming, Golding, and the ALSAPC Study Team (1997) supports this idea. Caregivers of prone sleepers reported longer continuous hours of sleep per night in comparison to supine sleepers; the results indicating differences in continuous hours of sleep for the caregivers of infants' that were under six months old were statistically significant. It seems as though the

adherence may have – at least in part - stemmed from the success of prone positioning for increasing the sleeping comfort of the infants.

Conversely, Mildred, Beard, Dallwitz, & Unwin, (1995) reported that some parents avoid prone positioning altogether. In their study, 100 full-term infant caregivers of babies 1 to 6 months old qualified and agreed to participate. Caregivers who had been given special medically-based positioning instructions were not among the 100 participants in the study. The self-administered questionnaire was developed with a combination of open and closed-ended questions. The investigators did not inquire if the participants had ever received any education about the benefits of prone positioning, although inferring from the data provided it seems doubtful that this was the case. According to the results and interpretation of the study, 93% of parents reported that awareness of SIDS effected how they positioned their infants; 84% reported full adherence with recommendations to avoid prone positioning for sleep; 37% reported knowledge of SIDS had an effect on how they positioned their infants for play, and 26% reported they never placed their infant in prone for play (1995).

Hunt and Puczynski (1996) suggested that avoidance of prone positioning in its entirety may increase the risk for plagiocephaly as well as increase the risk for deficits with motor milestone achievement. It seems there is potential for negative consequences stemming from the avoidance of prone positioning. Extrapolating from this, there would seem to be a need for educating caregivers of newborns about SIDS prevention recommendations as well as the importance of supervised prone for play positioning.

## Plagiocephaly and Torticollis

Although cause and effect has not been established, it seems that how infants are positioned for sleep is related to the incidence of SIDS. Infants' caregivers are the ones deciding how to position their babies for sleep. Infants' caregivers are also the ones deciding how to position their babies for supervised awake or play time. Although unconfirmed at this time, there may be a relationship between how infants are positioned when supervised and awake and infant development. More specifically, plagiocephaly and torticollis seem to be linked to how infants are positioning for daily activities, including for sleep and for play.

No empirical literature was found on the estimated incidence of torticollis or the relationship between torticollis and infant positioning. Infants presenting with torticollis are identified when the head is tilted towards the affected side, and rotated towards the opposite side (Cheng, Tang, Wong, & Wong, 2000). For example, if the right sternocleidomastoid muscle (STM) is tight, the head will laterally flex towards the tight, right side, and the head will rotate towards the left side. It is thought that both congenital and acquired torticollis can be influenced by infant positioning in that, if an infant is routinely placed in the same positions, their congenital torticollis will continue to be present (or worsen), or torticollis may develop from a lack of variety of positions to strengthen and stretch the neck muscles. When severe, torticollis can impact infant development. Jones (2003) listed the negative effects torticollis can have on development, stating it can effect "internal sensory maps or body image formation,

midline axial postural stability, and patterns needed for movement and balance development (2003, p. 51)".

However, there has been research regarding how torticollis may impact the development of an infant's head shape, as in the case of plagiocephaly (Golden, Beals, Littlefield, & Pomatto, 1999; Yu, Wong, Lo, & Chen, 2004). This potential and likely relationship may support the significant impact of infant positioning on the health and well being of infants. Torticollis is often related to flattening of the skull as the affected infant will favor turning their head to one side, placing extra pressure on that side of the skull for prolonged periods of time, causing undesirable molding of the skull. This undesirable molding of the skull is called plagiocephaly. Plagiocephaly is defined as a flattening and/or bulging of the skull that is determined to occur absent of any other congenital anomaly (Hutchison, Thompson, & Mitchell, 2003; Moss, 2000; Peitch, Keefer, LaBrie, & Mulliken, 2002; Persing et al., 2003). The likely relationship between torticollis and plagiocephaly was identified by Cheng, Tang, Chen, M. W. N. Wong, and E. M. C. Wong (2000); 90.1% of infants in their study of 1,086 cases of torticollis also presented with mild or moderate cranial asymmetry. The direction of the relationship, however, has not been determined with certainty; what came first, the plagiocephaly or the torticollis? Littlefield et al. (2001) also noted that the majority of infant patients seen for evaluation of plagiocephaly also presented with neck muscle dysfunction.

Identification of plagiocephaly is based on the presence of all or some of the following characteristics: one ear advanced forward in comparison to the other ear; jaw asymmetry; facial asymmetry; flattening on any part of the head; and bulging on any part

of the head (Persing et al., 2003). There is still much debate as to long term effects that may result from plagiocephaly if left untreated. Cosmetic concerns may have an effect on self-esteem (Biggs, 2003; Littlefield et al., 2001), and there may be negative effects on jaw formation, causing problems with the temporal mandibular joint (TMJ).

Consideration is warranted about the relationship between plagiocephaly and torticollis, and infant positioning for sleep and play (or awake time). According to a Media Advisory from the SIDS Alliance issued on July 31, 2000, approximately 2,000 babies per year are saved as a result of the SIDS prevention campaign recommendations; that is remarkable. However, a press release from July 8, 1999 (found at [http://www.eurekalert.org/pub\\_releases/1999-07/CMC-Sptl-080799.php](http://www.eurekalert.org/pub_releases/1999-07/CMC-Sptl-080799.php) on April 10, 2004) states that from 1994 to 1999, the incidence of plagiocephaly increased five-fold, from 1 in 300 to 1 in 60. The press release insinuates there may be a relationship between this increase in plagiocephaly and the recommendations for supine sleeping for infants. Miller and Clarren (2000) also note an increase in plagiocephaly cases, linked temporally to the SIDS campaign. Kane, Mitchell, Craven, and Marsh (1996) performed retrospective chart reviews of 269 infants diagnosed with plagiocephaly between 1979 and 1994. Overall, the authors concluded that there was a “temporal coincidence (p. 884)” between the SIDS Back to Sleep campaign and an increased incidence of plagiocephaly. They advocated for education about SIDS prevention while educating about “alternating head position while the infant is supine or side lying” (p. 884) to decrease the incidence of plagiocephaly. Turk, McCarthy, Thorne, and Wisoff (1996) conducted a similar retrospective study on 52 consecutive cases of plagiocephaly from

January 1992 to December 1994. Using standard criteria for identification, they indicated an increase in the incidence of plagiocephaly in healthy newborns, linked temporally to the SIDS Back to Sleep campaign. Investigators were able to describe an association between the SIDS prevention recommendations (decreased prone positioning) and the increased incidence of plagiocephaly. They recommended further research in this area to confirm any possible correlations.

One of the only studies that took into account how much total time infants spent in prone positioning into account (for sleep as well as other activities) in relation to plagiocephaly was conducted by Hutchinson, Thompson, and Mitchell (2003). These investigators compared 100 infants diagnosed with plagiocephaly with 94 control infants aged 2-12 months. The purpose of the study was to identify and quantify determinants of plagiocephaly. The researchers were able to identify specific factors that made infants more likely to develop plagiocephaly. One of the factors was that infants diagnosed with plagiocephaly were less likely to spend less than 5 minutes/day in prone by 6 weeks of age. The authors noted the likely influence of the SIDS Back to Sleep campaign on the increased incidence of cranial deformities. They also noted that awareness for SIDS prevention was high in the population studied, while awareness of preventative strategies for plagiocephaly was not. It can be inferred that providing preventative education with caregivers about supervised prone play and positioning of their infants may be important in preventing plagiocephaly.

It must be noted that Littlefield, Kelly, Reiff, and Pomatto (2003) have hypothesized that there are other positioning factors that may contribute to the incidence

of plagiocephaly in recent years. These investigators found that infants spending a significant amount of time in car seats, infant carriers, and swings, have an increased incidence of plagiocephaly. They did not report whether or not infants were spending more time in car seats, infant carriers and swings than they were prior to the SIDS prevention campaign. Littlefield et al. offers the following explanation for how positioning in these devices impacts head shape:

When placed in these devices as newborns, the infants have very malleable craniums and have not yet developed sufficient head and neck control to maintain their heads in midline against gravity. Subsequently, the head often comes to rest in a corner of the car seat or swing, where it is restricted along two planes...(2003).

Sweeney and Gutierrez's statements concur with Littlefield et al. (2003), in that there are several potential influences to how infants' heads are shaped, with some of these influences easily identified in the premature infant population. Sweeney and Gutierrez (2002) describe supine sleeping position, excessive use of infant car seats, and a lack of prone play can contribute to plagiocephaly. Studies such as these support the need for education about positioning of infants in several different positions, including supervised prone positioning.

While there are several factors that may contribute to the etiology of plagiocephaly and torticollis, research seems to indicate there has been an increase in the incidence of plagiocephaly since the Back to Sleep campaign (Turk, McCarthy, Thorne, & Wisoff, 1996; Argenta, David, Wilson, & Bell, 1996). Several authors speculate this probable relationship as well as hypothesize as to why there has been an increase in diagnosed cases (Turk et al., 1996; Argenta et al., 1996; Hutchinson, Thompson, &

Mitchell, 2003). The natural extension of the identification of these conditions is their treatment. The treatment of plagiocephaly can be time consuming, stressful, and costly.

### Developmental Delays

In addition to the development of plagiocephaly and torticollis, there may be delays in motor skill achievement as a result from a lack of prone positioning in newborns (Davis, Moon, Sachs, & Ottolini, 1998; Dewey, Fleming, & Golding, 1998; Jantz, Blosser, & Freuchting, 1997; Miller & Clarren, 2000; Ratliff-Schaub et al., 2001; Salls, Silverman, & Gatty, 2002). While Davis and colleagues (1998) suggest that the developmental delays may be transient, there are no long term studies to support this. Further, it has been suggested that a relationship exists between plagiocephaly and developmental delays (Miller & Clarren, 2000). However, these authors were not able to determine whether the child that developed plagiocephaly was more susceptible to developmental delays in areas of behavior and/or learning problems, or if the plagiocephaly caused these delays. Thus, there is much more to be learned and understood about this problem. A relationship between how infants are positioned for sleep and awake time and when infants reach developmental milestones may exist. It seems that the more opportunities an infant has to use different muscle groups, and experience different positions in space, that more opportunities for facilitation of motor milestone achievement could take place. However, the literature does not give substantial support to these seemingly logical relationships. In reference to hospitalized premature infants, Sweeney and Gutierrez (2002) state that it is advantageous to infants to be placed “in a variety of recumbent postures, [because in these positions] they



experience varying forces and pressures through joints and muscles that positively influence joint and mechanoreceptor development in preparation for coordinated movement (p. 59-60)". Perhaps there is potential for these ideas to be generalized to newborns that thrive outside of the neonatal intensive care unit as well.

Further study into the potential association between infant positioning and motor skill achievement is clearly warranted, as there does not seem to be an abundance of solid research about this likely relationship. It does appear as though attempts to identify a relationship between how infants are positioned for sleep and when they reach developmental milestones have been made at least since 1960. An English physician named Holt (1960) described American babies demonstrating "superior" motor skill achievement in the prone position when compared to the population of infants he was used to seeing in England. Holt also noted that there was not a substantial difference in how American babies performed in the supine position compared to babies he typically saw in practice. At the time, the majority of American babies were placed prone to sleep in comparison to the infants he was used to seeing in England, where the majority of infants slept supine. The author did not offer any insight as to why positioning traditions were different in different cultures.

Another older study by Modlin, Hawker, and Costello (1973), made an attempt to analyze the relationship between sleep and awake positioning on early development. The researchers looked at how two groups of 7-month-old infants were positioned for sleep/awake time. The infants were categorized as follows: prone for sleep, and supine for awake time; prone for sleep and prone for play; supine for sleep and prone for play;

and, supine for sleep and supine for play. According to this study, sleep position did not appear to have an effect on motor skill achievement. The researchers suggested that positioning during awake time may influence developmental skill achievement, although the results from this investigation did not provide sufficient evidence to support this. Infants that spent most of the time prone when awake scored higher than infants that spent more time supine when awake, for “pre-walking progression” and “pulls to sitting” as measured using the Bayley Scale. The authors maintained that no conclusions could be drawn from the information gathered, and further study in this area was warranted. Overall, what can be gleaned from this article, 37 years later, is that the study of infant’s positioning when awake in relation to developmental milestones could be quite useful.

While the Modiln et al. (1973) study took positioning for sleep and play into account in their study, not all studies take sleep and awake positioning into account. For example, according to Davis, Moon, Sachs, and Ottolini (1998), sleep positioning of newborns may impact motor milestone achievement. These investigators performed a prospective, practice-based study with 351 healthy infants under 2 months old. Overall, the prone sleepers reached motor milestones at an earlier age than supine or side lying sleepers. The parents of the infants completed sleep logs that detailed position of sleep and length of sleep in each position during the first few weeks of life, and then provided monthly updates about positioning through the first 6 months. The authors noted that sleep position was determined by the position the parents placed the infants in for sleep, and that this seemed to be an accurate way to denote sleep position in infants until they reach 6 to 7 months of age, when they might choose their own position for sleep. This

assumption may not be fully accurate given that infants may begin rolling over by four months of age, thus enabling them to move out of supine or prone positioning considerably earlier than 6-7 months of age. The parents of the recruited infants also completed developmental logs about their infants' motor skill acquisition. The investigators report that the babies who were prone sleepers in the first few weeks of life reached the rolling prone to supine, tripod sitting, creeping, crawling, and pulling to stand milestones earlier in comparison to the babies who were supine or side lying sleepers. The authors found these results valuable to pediatricians, and other pediatric PCPs. The investigators stated the results of the study could be used to reassure parents that the expected trend may be that infants that sleep in supine or side lying may reach milestones later than infants that sleep prone, and not a reason to abort the SIDS prevention/Back to Sleep campaign. They further indicated that any delays identified in infants using supine for sleep are likely to be transient. However, they did recommend that pediatricians encourage prone play at the 2 month old and 4 month old check-ups to address the need to build upper body strength. The authors did not expand on why pediatricians should wait until the 2 month old and 4 month old check ups to address upper body strength building with the caregivers. Information regarding infant positioning for both sleep and awake time may be valuable to analyze potential relationship between developmental milestones and positioning of infants.

It seems that valuable information may also be obtained by examining any changes that might occur in infant morbidity and mortality in relation to how they are positioned for sleep over time. There are few published studies that look at infants

before, during, and after initiation of the SIDS prevention campaign. Hunt, Fleming, Golding, and the ALSPAC study team (1997) and Dewey, Fleming, Golding, and the ALSPAC Study Team's (1998) are among the few that performed prospective, longitudinal, population-based studies. However, two important points should be considered before evaluating incidence of prone sleep positioning in the populations studied in both Hunt et al. and Dewey et al.'s studies:

- Even before the Back to Sleep recommendations were implemented, the avoidance of prone positioning for sleep was thought to be more common in some cultures, including Great Britain (Argenta, David, Wilson, & Bell, 1996). Although this is the same country where Hunt et al. and Dewey et al. conducted their studies, it cannot be assumed that the populations used in their studies fall under this categorization; it is however, possible. This history and timing may indicate that the study conducted revealed similar results in this culture as it might after the implementation of a formal campaign.
- Further, Dewey et al. did state that prone sleeping had decreased significantly prior to any public campaign because health care providers were notified of the potential risks associated with prone sleeping in 1989. Again, although the formal campaign was not yet initiated, there might have been education of caregivers about positioning recommendations prior to this study.

The significance of the timing of these studies beginning before the Back to Sleep campaign was launched may not be as significant as if it had been conducted in traditionally prone-sleeping cultures (such as in the United States). However, the authors

did offer information about the impact of supine sleeping on infants. Hunt et al. (1997) queried the possibility of adverse effects from supine sleeping on infants in the first 6 months of life in a prospective study format. Their main concern was to identify indications that supine sleeping could be harmful to an infant. As was to be done by Davis et al. (1998), Dewey and colleagues (1997) considered sleep positioning only in their study. While their main research question was about the potential negative impact of supine sleep positioning, it seems as though it would be difficult to not consider the potential impact of how infants are positioned during awake time as well. The investigators identified three time periods for data collection: before the national Back to Sleep campaign in the United Kingdom (UK) (between June 1991 and October 1991), during the campaign (between November 1991 and April 1992), and after the campaign (between May 1992 and February 1993). The questionnaire asked about sleep positioning:

- position of infant when placed for sleep at night
- position when the infant wakes up

The choices for positioning were:

- back
- side
- front
- varies

Hunt and colleagues identified a significant decrease in prone sleep positioning, and an increase in supine sleep positioning over the time periods listed, despite the potential

cultural and timing impact(s) on infant positioning outlined above. Initially, 9,777 caregivers of infants responded to a positioning questionnaire when their infants were between 4 and 6 weeks old. Subsequently 8,524 of the same group of caregivers provided information when their infants were between 6 and 8 months old. Information was gathered from medical records and caregiver-completed questionnaires. Based on an 85% response rate, results indicated that there was no immediate harm in the strict supine sleeping recommendations. However, sleep positions at 4 weeks of age were assumed to be consistent through 6 months of age, a potentially flawed assumption as indicated earlier.

Subsequently, a follow up of Hunt et al.'s study was conducted by Dewey, Fleming, Golding, and the ALSPAC Study Team's (1998). Dewey et al. also followed infants before and after the implementation of the supine sleeping recommendations, with a focus on specific developmental issues in relation to positioning through 18 months of age; social, communication, fine and gross motor, and total developmental scales using the Denver Developmental Screening Test. The reason it is important to consider the fact that the study was initiated prior to the formal implementation of supine sleep recommendations is because this timing may have allowed for the potential for an increased number of prone positioning sleepers in comparison to studies introduced after the recommendations. Despite this timing, relatively low numbers of infants were reported to be positioned in prone for sleep at 4 weeks, 6 months, and 18 months of age; 3.8%, 3.6%, and 3.8% respectively. Perhaps this is due to the cultural and timing issues listed above. Initially, 14,138 surveys were administered; one for each infant that

survived the first month of life between April 1, 1991 and December 31, 1992 in Avon (UK). As in Hunt et al.'s (1997) study, the questionnaire asked about sleep positioning:

- position of infant when placed for sleep at night
- position when the infant wakes up

The choices for positioning were:

- back
- side
- front
- varies

Of the 14,138 solicited, 12,208 caregivers responded to the positioning questions. When the children reached 6 months, and then 18 months of age, 10,579 developmental responses were recorded. Then, when the children were between 18 and 22 months old, 10,183 developmental responses were recorded. The authors identified an increase in cognitive scores among the prone sleepers (0.11 SD units, statistically significant) and in motor testing skills among prone sleepers (0.38 SD units, also statistically significant), particularly apparent at approximately 6 months of age. There was an overall increase in the total scores for prone sleepers at 6 months of age, 0.20 SD units increase in this population compared to supine sleepers, side sleepers, and varied sleepers. However, the investigators interpreted the data to indicate that these delays were transient because at the 18-22 month assessment there were no statistical advantages associated with prone sleeping in comparison to infants that slept in other positions. This report did not provide any information about how much (if any) prone time any of the babies had while

supervised and awake. It would be interesting to learn if the infants that were demonstrating delays initially were provided with any intervention, or given supervised prone play time; this study looked at sleep positioning only.

Three studies utilizing select information about infant performance on the Denver Developmental Screening Test – Revised (Denver II) include research by Jantz, Blosser, and Fruechting's (1997); Salls, Silverman, and Gatty (2002); and Nelson, Yu, Wong, Wong, and Yim (2004). Infants historically learn to roll from prone to supine before rolling supine to prone, Jantz et al. performed a retrospective chart review in a pediatric private practice, looking at the Denver Developmental Screening Test- Revised results from 4 and 6 month well baby visits. Inclusion criteria for this study consisted of; full term birth, appropriate birth weight for developmental age, head size within normal limits, and attending the 4 month old well baby check-up  $\pm 2$  weeks of the 4<sup>th</sup> month birthday. Two hundred fifty-seven infants were included in the study. Results from the Denver indicated that infants who sleep in side lying or supine roll over later than infants that sleep prone. Jantz et al. (1997) also found that infants who slept supine were more likely to roll from supine to prone before prone to supine. This finding suggests that sleep position may impact the timing of developmental milestones. Jantz et al. identified the need to study whether parents that put their babies to sleep in supine allow them to play in prone, and if so, for how long each day. The investigators also suggest that further investigation is warranted about the potential impact of delayed milestones - as may be associated with sleep position – and the potential for long-term developmental consequences.



The only study to attempt to quantify adequate tummy time for infants to achieve gross motor milestones when expected was conducted by occupational therapists, Salls, Silverman, and Gatty (2002). Salls and colleagues performed a descriptive, quantitative pilot study using a cross-sectional sample of infants. In 1998, the investigators compared 66 infants' developmental milestone achievements at 2 months, 4 months, and 6 months of age and compared and contrasted the data with what the Denver II qualifies as "normative data" from 1988. Salls et al. considered the following gross motor milestones to compare:

- head up 45°
- head up 90°
- sit-head steady
- chest up-arm support
- roll over
- pull to sit- no head lag
- sit - no support

The investigators concluded that 2 month-old infants that spent more than 15 minutes a day in prone – while awake – tested within the Denver II normative range for gross motor development in three gross motor milestones; head up 45°, head up 90°, and sit-head steady. In comparison, 2 month-old infants that spent 15 minutes or less in prone during awake-time did not test in the normative range for these three gross motor milestones. Attainment of these specific motor milestones is dependent on antigravity extensor control. What this suggests is that spending over 15 minutes a day of supervised tummy

time may be important for infants if they are to attain gross motor skills on time. As was found in Jantz, Blosser, and Fruechting's (1997) study described previously, the majority (64%) of infants in Salls et al.'s study rolled supine to prone around 4.1 months of age. This finding lends even more support to the idea that sleep position may influence which way infants roll over first. At 6 months of age, there were no statistical advantages associated with a specific sleep position. However, Salls et al. stated that rather than say there was no relationship at 6 months of age in sleep position and motor skill levels, they found their results inconclusive because of:

- Small sample size, and;
- The potential for inconsistency with testing "sit no support" using the Denver.

The authors stated that a child may pass this item by using upper extremities for support.

Salls et al.'s inquiry into the potential relationship between infant positioning and motor skills is similar to what Hutchinson, Thompson, and Mitchell (2003) looked for in relation to time infants spent in prone and the incidence of plagiocephaly. Salls et al. acknowledged the SIDS prevention campaign as having an influence on caregivers' positioning of their infants, which has then impacted gross motor development. They advocate for further research in this area, and describe implications for infant caregiver education. They also advocate for occupational therapists to promote "Back to Sleep and Prone to Play (Salls et al., 2002, p. 580)." While this study linked infant positioning and gross motor skill development, it failed to account for variance in day-to-day performance since all assessments were carried out at single time points.

A more recent investigation of the potential relationship between developmental milestones and positioning of infants for sleep and for play was conducted by Nelson, Yu, Wong, Wong, and Yim (2004). These investigators identified cultural and ethnic influences on how infants are typically positioned for sleep and for play in Chinese infants in Hong Kong. Nelson et al. explain that typically infants in this culture roll from supine to prone before prone to supine, which is opposite from how the Denver Developmental Screening Test – Revised suggests, and opposite from how traditional western culture suggests this milestone is sequenced. Interestingly, the authors state that whether the infants were given “tummy time” had no impact on achievement of the rolling milestones, however, that data did not reflect how much tummy time these infants were given, or how consistently they were given tummy time. The authors later described several cultural influences on how Hong Kong Chinese infants are positioned through their first 10 months of life. Many mothers do not let their infants crawl, they carry them around, and many do not offer prone time for play on the floor. What can be gleaned from this article is that perhaps in cultures where supine sleeping is the norm, infants may roll supine to prone before prone to supine. No mention of the incidence of head shaping or torticollis was made in this study.

One might ask why any potential trends in motor skill delays would be significant, if they are transient and may resolve on their own. In an informational article, Jones (2003) makes two interesting points regarding the significance of these potential motor skill delay trends. First, while the motor delays may be transient physicians and therapists use motor milestones to assess and address neurological

development. Thus, documentation of delays may be misleading. Second, much of a parents' perception of how her infant is doing is intertwined with feedback from these professionals on the attainment of developmental milestones (Jones, 2003). This can impact the co-occupation of mother (or father) and child by causing anxiety and concerns about delays, when it is possible that the delays are caused by lack of exposure to variety of positioning to strengthen the anti-gravity extensor muscles, neck, arms, and trunk (Jones, 2003).

### Caregivers and Positioning

While the shift from prone to supine placement of newborns by caregivers is apparent, its cause is likely to have roots sprouting from several influences. These may include any combination of environmental and occupational influences, and influences from a single person, or group of persons.

There are several investigations that suggest inconsistency in how and why caregivers are educated about positioning their newborns. Examples of how infant caregivers are educated by PCPs include but are not limited to, verbal instruction, and modeling behaviors. Examples of why infant caregivers are educated with specific recommendations may include the PCPs' own perceptions of what they feel is best for the infant. What the PCPs feel is best may not always be in concordance with the AAP recommendations.

The apparent decrease in prone sleeping infants and substantial decrease in SIDS-related deaths is not consistent throughout the population in the United States (Colson, Bergman, Shapiro, & Leventhal, 2001). Studies indicate that at least some of this

inconsistency may have roots in socioeconomic or environmental influences. Ray, Metcalf, Franco, and Mitchell (1997) found that when comparing parents in a private pediatrician's office to parents in an inner-city clinic, there was not a statistical difference in compliance with recommendations - provided positioning recommendations had been given. Nursing supervisors reported the discharge infant sleep recommendations that were provided to parents at the hospital, with specific attention provided to the use of blankets and positioning. A total of 50 healthy infants from private practice settings and 50 healthy infants from inner city practices were used for the study. According to responses given by nursing supervisors', the hospital serving 73% of the inner city infants had not adopted the AAP recommendations for SIDS prevention; 79% of the inner city infants were reportedly being placed prone for sleep. Two other hospitals that served 80% of the private practice clients and 22% of the inner city practice clients did report using the AAP recommendations for sleep in their discharge education. Sixty-seven percent of the private practice parents and 60% of the inner city practice parents from these two hospitals reported using the recommended positioning for their infants. Overall, parents from the inner-city received significantly less (or no) education about SIDS prevention than the parents that used the private practice. This study demonstrates the power of and need for education in all socioeconomic groups. Colson, Bergman, Shapiro, and Leventhal (2001) conducted an investigation about "how" some infant caregivers are educated about sleep recommendations. The investigators also reflected on a review of the literature and reported that studies show that infants in African American families and families in inner-city settings are more likely to be placed in prone

for sleep. These investigators noted that parents who were advised to place their infant in the supine position were more likely to place their infants in that position. However, not all of the parents in this study were advised to place their infant in supine for sleep. The parents in this study further indicated that they tended to follow what was modeled at the hospital; if the nurses did not model the recommended supine sleep positioning, many parents did not appreciate its importance. Instead they modeled the positioning they witnessed in the hospital, which was side-lying for sleep. Per the results of Colson et al.'s investigation, the education provided to inner-city families was not consistent with AAP recommendations.

Shortly after Colson et al.'s study, Pollack and Frohna used data from a large population-based study run by the CDC, called the Pregnancy Risk Assessment Monitoring System (PRAMS) for their inquiry. Similar to Colson et al., these investigators reported that infants in African American families were more likely to sleep prone. They also reported that very low and extremely low birth weight infants were very unlikely to sleep supine, and that infants in households with more than three other children were more likely to sleep prone (2002). Willinger, Ko, Hoffman, Kessler, and Corwin (2000) also noted a cultural factor in how infants are positioned: in a study of a predominantly low-income African American population, the presence of a grandmother in the home almost doubled the incidence of prone placement.

The next question that comes to mind is “why” there might be inconsistency in how caregivers of infants are educated about positioning their newborns for sleep. For example, why didn't the nurses in Colson et al.'s study model recommended positioning

in the hospital setting? Hein and Pettit (2001) reflected on the “why” behind the actions of nursery nurses in regard to infant positioning. The investigators surveyed nurses to assess what types of education about positioning they provided, and why they make the types of positioning recommendations they do. The majority of nurses surveyed recommended placing infants in side lying, instead of supine. The nurses cited fears of infant aspiration and also felt their side sleeping recommendations were in compliance with a resource that stated side sleeping is acceptable positioning for newborns. Hein and Pettit (2001) made it clear that they felt supine sleeping, not side sleeping is the best positioning for SIDS prevention, secondary to instability associated with side sleeping. If parents of newborns observed the nursery nurses placing their infants in side lying, they would be likely to be influenced by what they see in practice. A study by Stastny, Ichinose, Thayer, Olson, and Keens (2004) also supports the idea that there is inconsistency with how hospital-based nurses position infants. The investigators reported that 72% of 96 newborn nursery nurses verbalized that placing newborns in supine positioning is the best position for SIDS prevention. However, only 30% of the nurses supporting supine position actually utilized that position in the nursery, secondary to fear of aspiration. This fear of the infants’ aspirating was cited as being the nurses’ motivating factor for positioning infants in “non supine” positions (prone and side lying). Furthermore, only 34% of nurses said that they advised mothers of newborns to use exclusive supine placement with their newborns; thirty-six percent of mothers surveyed reported using exclusive supine positioning. In this study, the term “exclusive supine

positioning” was interpreted to mean absence of any prone positioning, even for supervised play.

Hospital-based nurse positioning practice was also investigated by Peeke, Hershberger, Kuehn, and Levett (1999). The positioning of healthy infants (N = 206) was observed by investigators. The investigators reported that out of 206 infants, 55% of were observed to be positioned in side lying, 29% of the infants were observed in supine, and 16% were in prone. The investigators reported that 56% of these infants were placed in their sleep position by the nurses, with 8% observed to be placed in the sleep position by a parent. In addition to less than 100% compliance with AAP recommendations for positioning, the investigators also witnessed decreased safety with the bedding environments of many of the infants. The authors reported that changes in the infants’ environments were made during the study period, and that occupational therapists assisted with these changes. The authors were unable to account for who positioned all of the infants for sleep. In addition to observations, these investigators used an Infant Sleep Position Questionnaire Assessment for 103 hospital-based nurses. While 97% of the nurses noted they were aware of the AAP recommendations about sleep position, 32% stated they disagreed with the recommendations. These studies were useful in that they support the idea that health care practitioners have enormous influence on how AAP recommendations are carried out. Health care practitioners can also have great influence on caregivers’ actions.

In addition to the potential influence of nurses on how caregivers of newborns position their infants, Willinger, Ko, Hoffman, Kessler, and Corwin (2000) researched



how caregivers were influenced by combinations of types of information. These investigators found that the caregivers' choices of infant position were influenced by a combination of information from the media, pediatricians, nursery nurses, and family members. Approximately 1,000 phone interviews were conducted annually between 1994 and 1998, to estimate how many infants were still placed in prone despite the SIDS prevention recommendation. The researchers report that as many as 20% of infants were still being placed in prone for sleep. The study was only able to account for caregivers that had phone access. The majority (82%) of caregivers that placed their infants in prone for sleep provided responses like: "the baby likes it better and/or sleeps better that way (p. 2139)". Over 65% of caregivers surveyed reported that they placed their infants in supine or side lying because it had been recommended by medical professionals, or they had read about positioning of infants. Willinger, Ko, et al. (2000) reported that this group was 10 times more likely to say they had heard about not placing their baby in prone on the radio or television, and 20 times as likely to cite SIDS prevention-related recommendations as a reason to place their infant in supine or side lying in comparison to caregivers that placed their infants in prone. The authors recommended further education of caregivers.

The aforementioned studies make it is clear that there is a need for consistent modeling and education from health care providers about SIDS prevention positioning of newborns for sleep. Unfortunately, there is significantly less literature available about the incidence of caregivers providing supervised prone positioning for activities other than sleep.

Mildred, Beard, Dallwitz, and Unwin (1995) investigated how parents' perceptions of sleep position recommendations may effect how parents play with their infants. The results from this study provide information that supports concerns related to infant positioning. That is, some parents of infants may perceive their SIDS prevention education message as being: "Do not leave your baby unsupervised in the prone position because of the risk of SIDS; your child could die." The authors note that there needs to be education about prone positioning for play, as "supervised wakeful time in the prone position (p. 499)" is not a risk factor for SIDS. Current recommendations for supervised prone positioning, and for a reprieve from positioning in devices, are vague at best. Persing et al. (2003) provided the following guidelines for "preventative counseling" for plagiocephaly:

To prevent the deformity, parents should be counseled during the newborn period (by 2 to 4 weeks of age) when the skull is maximally deformable. Parents should be instructed to lay the infant down to sleep in the supine position, alternating positions (i.e., left and right occiputs). When awake and being observed, the infant should spend time in the prone position. The infant should spend minimal time in car seats (when not a passenger in a vehicle) or other seating that maintains supine positioning.

While there are temporal recommendations of when to begin education, the actual specifics of how prone positioning should be done at one time, and how many times per day an infant should spend in prone are not provided. Further, there are not specifics about what "minimal time" means in regard to positioning devices. The context for one caregiver may vary greatly to that of another caregiver, allowing for a wide interpretation of this recommendation.

In order to promote variety in how infants are positioned, Neufeld and Birkett (1999) suggested a community approach to the treatment and prevention of the type(s) of plagiocephaly that are thought to be caused by positioning. They suggested educating caregivers about rotating infant's head positions in supine, changing toy, mobile, and crib positions, encouraging supervised prone play, limiting the time the infant spends in car seats and swings, and recognizing and treating torticollis early.

Only one published study was identified that addressed physicians' views and their role(s) in educating parents of newborns about positioning for sleep and for supervised play (Hudak, O'Donnell, & Mazryka, 1995). However, it seems probable that physicians do have a role and an influence on the education of newborn caregivers about positioning. Colson, Bergman, Shapiro, and Leventhal (2001) conducted semi structured interviews about sleep positioning with the parents of one hundred infants: 47% of the parents noted that they had received postpartum education about positioning from a nurse, and 46% reported receiving sleep position education from a doctor. A portion of a transcript from an unpublished graduate project (Choffin, 2005) extrapolated and presented below reflects the potentially powerful influence of physicians about this topic.

#### *Primary Care Providers' Perception of Influence*

PCPs have tremendous potential to influence caregivers about choices they make for parenting infants and children. Knowledge of this influence can be beneficial, as the PCPs can realize that they can have a significant impact on their clients' daily living with the words they choose to use while educating caregivers about positioning infants for sleep and for play.

During interviews in the spring of 2005, two physicians described how they perceived their potential to influence or impact infant care. Dr. T stated: “If they hear it [infant care recommendations] from me, a physician, it is usually better than starting a battle between mother-in-law (or whomever) and new mom...Let’s not do that, let’s bring her in and I can answer all of the questions at one time.” In this example, Dr. T is describing how she sometimes recommends that caregivers bring supportive family into the well-baby visits to ensure that the recommendations are understood by all influential parties. Dr. T also stated: “I think they [infant caregivers] have heard so much about SIDS, that they are afraid of tummy time...to hear the doctor say, it’s okay to do, they get excited, nervous...” In this example, Dr. T is identifying the potential power of the “word” from the physician. She identified her perception that most clients trust what the physician says, and are influenced by the education physicians provide.

Dr. M described similar perceptions when he stated: “But certainly...when it comes from the doctor, the patients are like, “Oh really, I should be doing this” and they believe this is the ‘gospel’...it’s like they should be doing this...” What can be inferred from this theme is that if these two informants are representative of the culture of family practice physicians, then family practice physicians have insight into the influence they can use in medicine. This insight relates to the area of interest for this researcher; it is possible that occupational therapists can capitalize on the power of the physicians’ word, by educating physicians about the importance of recommending supervised tummy time while educating about positioning for SIDS prevention (Choffin, unpublished project, 2005).

*What is being done about Tummy Time?*

There are no standardized guidelines regarding (exactly) when after birth prone positioning is acceptable. There are also no guidelines about how much prone positioning is adequate to facilitate milestones and to prevent plagiocephaly and torticollis. Personal communications with Dr. T and Dr. M., family practice physicians, during a project in the spring of 2005, yielded the following conversation about educating parents about tummy time:

**Dr. T:** I do want them to give the baby tummy time. And usually I start that about 3 weeks to one month...when I think the baby has enough head control...that they can lift their head from the table...that is something I go over, and show the parent. I place the baby on the exam table, and say 'I just want to see that they can protect their airway,' is how I phrase it, but what I want to know is can the baby can lift their head from one side to another. (Demonstrates head movement) And I want to see that in the office...and I tell them that I am less concerned about that baby having a SIDS event than I am a baby who can't...

**Amy:** How do you clarify the need for supervision for tummy time? Maybe to a parent that does not have extensive educational background?

**Dr. T:** I tell the parents that the baby should not be on their tummy without mom in the room, and that sleeping and individual time is always on the back. If they have to leave the room, go to the bathroom, the baby should be on the back or the side...(Choffin, 2005, p. 17).

The following is an excerpt from a transcript of an interview with Dr. M, another family practice physician, about the same topic:

**Dr. M:** And then, positioning, I will not bring up unless it's an issue...for instance unless they've got...unless when I examine them [the infant] and I see something like plagiocephaly, I will ah, talk to them [the caregiver] about how much time they [the infant] spend in the car seat, how much time on their tummy.

**Amy:** When do you feel it is okay (age-wise) for a parent to begin to initiate tummy time?

**Dr. M:** Um, anytime (Choffin, 2005, p. 30).

It is not uncommon for infants new to prone positioning to demonstrate poor tolerance of this position as evidenced by crying and screaming; they are not used to it. It seems natural for parents to follow cues from their babies, especially if following the babies' cues means the baby will stop crying once "rescued" from the prone position. Jones (2003) used a literature review and clinical experience to describe her concerns with a lack of prone play positioning for newborns. She acknowledges the potential for parents to avoid prone positioning for their infants because of the fear of SIDS, *and* because the parents say their infants do not like being prone. She also says that prone play positioning can begin in the NICU or nursery if an infant is stable enough for supine sleep. The increased potential for gross motor delays in children that are not provided opportunities for prone play is present and she stresses that "Prone to play (p. 49)" needs to be promoted with equal fervor as Back to Sleep. Jones also calls upon clinical experience to describe the impact of sole supine positioning of infants on their skull shape, and torticollis, and indicates that it seems that many of these cases could be prevented with prone play positioning. Occupational therapists can assist parents in coming up with alternative positioning, and opportunities to make alternative positioning a positive interaction time for play between the parents and their infants. Persing and colleagues (2003) reported on the prevention of skull deformities in infants, and advocated for "A certain amount of prone positioning, or 'tummy time,' while the infant is awake and being observed (p. 200)" to prevent flattening of the skull.

In the same vein, Sweeney and Gutierrez (2002) discuss the importance of a variety of positions and stimulation for neonates in the NICU to: “(1) support posture and movement; (2) optimize skeletal development and biomechanical alignment; (3) provide controlled exposure to varied proprioceptive, tactile, and visual stimuli; and (4) promote calm (p. 64)”. The authors also advocate for taking the opportunity to use discharge teaching from the hospital as a teaching opportunity. The same goals can be generalized to the well-baby population.

A July 31, 2000 Media Advisory found on the SIDS Alliance website states that some physicians suggest flattened skulls may become the “new normal.” In fact, Dr Thomas Keens of Los Angeles Children’s Hospital believes that people are overreacting to what he sees as a temporary problem. According to this same press release, Australian Professor Susan Beal, MD, held up a picture of a baby with a flattened skull and declared it to be the “Mark of a healthy baby!” Based on a review of the literature, this author proposes education about SIDS prevention and supervised tummy time to be warranted.

#### Theoretical Application and Occupational Therapy

There is great potential for occupational therapists to be involved in preventative medicine, in the public health domain. The training occupational therapists receive in their formal education and in the field make them a strong match for complex public health issues. The issue of supine positioning to prevent SIDS, while potentially increasing the incidence of developmental delays, torticollis, and plagiocephaly, is one of those complex health issues. Public health is defined as a system that has a population-based focus. Sanderson, Lohman, and Bramble (2003) state, “Public health is a system of

surveillance and services to a population that are intended to identify and reduce mortality, morbidity, and disability due to illness, injury, and disease (Sanderson, Lohman, & Bramble, 2003, p. 243)". The *Occupational Therapy in the Promotion of Health and the Prevention of Disease and Disability Statement* (2001) further describes and defines the roles of occupational therapy in relation to prevention of disease and promotion of wellness. According to this statement, there are three levels of prevention. Primary prevention involves the use of education much like what is seen with SIDS prevention education and what may be seen with education about supervised prone positioning in newborns (to prevent plagiocephaly). Secondary prevention involves early detection and treatment, as may be seen by pediatricians and occupational therapists in the early identification of plagiocephaly in infants. Tertiary prevention involves treatment that is put in place to stop disease and prevent further disability.

Preliminary, informal discussions with family practice physicians and parents suggest that there is great inconsistency in the types of education that are provided to parents about positioning of newborns for sleep and awake time. Informal inquiry with local family practice physicians referred to earlier revealed that members of the medical community do not see great importance in infants receiving supervised tummy time. Informal discussions with local pediatricians and parents revealed that there may be inconsistency in how, why, and if PCPs refer to specialists for evaluation and intervention for plagiocephaly, torticollis, and developmental delays.

Perhaps there is a role for occupational therapy in facilitating greater consistency in the education of new parents for positioning. Occupational therapists are well equipped



to provide information on positioning for supervised play for optimal development, and sleep for optimal prevention of SIDS.

Occupational therapists have strong theoretical roots, anatomical, developmental, neurological, and psychological education backgrounds; and training to embrace the whole person. The training encourages clinicians to look at the whole person in the context of daily living, taking into account a multitude of possible influences, from family and friend support networks; cultural influences; and physical and mental abilities and the physical environments. The specifics of what are meaningful occupations to the client and family are reflected in the client-centered interactions facilitated through therapeutic interactions.

Occupational therapy is supported by strong but dynamic, descriptive and thoughtful theories. These theories help identify, interpret, and impact therapeutic interventions and therapeutic relationships for physical and mental health issues, public health issues, and society at large. Theories can help in the initiation and execution of client-centered assessment and treatment. The Person-Environment-Occupation Model (PEO) is used in occupational therapy to describe the continuous transactions between the person, environments, and occupations, how they impact one another, and how they have an effect and are affected by each other, in varying contexts. This transactional model emphasizes that no one component can be separated from the others. This includes context(s), temporal, physical, or psychological influences (Law, Cooper, Strong, Stewart, Rigby, & Letts, 1996). The evolved PEO transactional model is depicted as three overlapping circles; with Person, Environment(s), and Occupation(s) inside each

circle. These circles are shown with the overlapping portions of the circle exemplifying areas of mutual impact, where the issues going on with the person may impact the environment, and at the same time the environment may be influencing the person, and so on; where this overlap occurs is where occupational performance arises. Strong, Rigby, Stewart, Law, Letts, and Cooper (1999) describe occupational performance to be “the dynamic experience of a person engaged in an occupation within an environment over time (p. 124)”.

PEO allows for varying degrees of overlap between the circles, the closer the circles overlap, the more synchronicity between the spheres and the greater occupational performance. The amount of overlap at any time is dependent on the context(s), emphasizing the dynamic nature of the transactions between the person, environments, and occupations over time. The PEO model has evolved from components of environment-behavioral and client-centered practice models (Strong, et al., 1999); client-centered treatment is crucial to the therapeutic relationship (Law, Baptiste, & Mills, 1995). Figure 1 is what the PEO model looks like when there is balance between the Person, Environment, and Occupation; there is an equal amount of overlap between each circle, each component is influencing the others, and being influenced by the others equally.

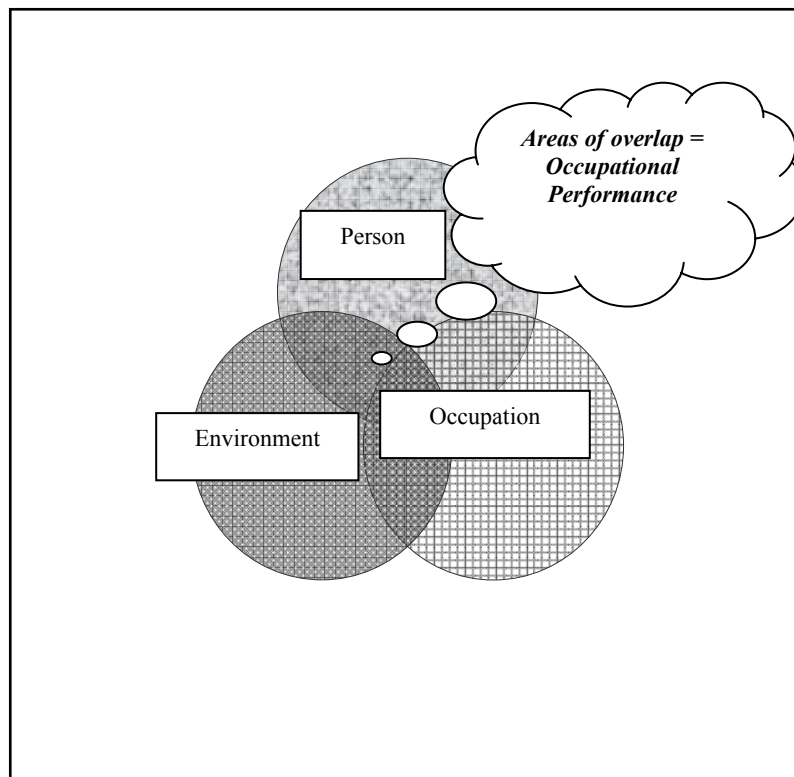


Figure 1

*Person-Environment-Occupation Transactional Model*

*Note.* This figure is adapted from Law et al. (1996)

The training of occupational therapists provides clinicians with insight into these large overlapping areas with a focus on client-centered practice. There are several examples of how each component of the PEO Model can be applied to the issues related to how infants are positioned for sleep and supervised play, as well as the impact of positioning on the incidence of SIDS, skull shape, torticollis, and development of motor skills in the first year of life.

*Person*

The “Person” part of the PEO model consists of components like mood, temperament, and attention. There are several potential influences on and from the

Person component of PEO. Lawton, an environmental behavioral theorist, offers insights into the person-environment interaction from the environmental behavioral perspective. In this work it is suggested that diminishing personal competence, such as that faced in the aging process, results in greater vulnerability to the influences within the immediate environment (Lawton, 1986; Law, Cooper, et al., 1996). It seems that the same assumptions could hold true for an individuals' perception of competence. For example, a vulnerable new mother may perceive herself as being incompetent, and may be more easily influenced by family members with greater experience. This has been suggested by Willinger, Ko, Hoffman, Kessler, and Corwin (2000), who found that the presence of grandmothers in the home of low-income African American households coincided with double the incidence of prone placement of infants for sleep. Perhaps some of this can be attributed to the temperament of the grandmother in relation to the temperament and/or mood of the new mother. A transcript excerpt from an unpublished graduate project (Choffin, 2005) further supports the potentially powerful influence of family members on new parents:

**Dr. T:** One of the biggest challenges I think for me is fighting, no wrong word...is dispelling the mother-in-law myth. How to position. I have had a lot of mothers-in-law tell moms that the babies should be on their tummy...

(continued later in the conversation)

**Amy:** As far as extended family...in light of the mother-in-law myth you described...how do you handle these influences? Are you able to do anything other than just reeducating the family?

**Dr. T:** I invite them to the visits! Any time mom gives me any indication that there is pressure from anyone else.

**Amy:** How is it received?

**Dr. T:** If they hear it from me, a physician, it is usually better than starting a battle between mother-in-law (or whomever) and new mom...Let's not do that, let's bring her in and I can answer all of the questions at one time.

During this conversation, Dr. T implied that this mother-in-law influence was often quite strong in her infant caregiver population. There may be potential implications for occupational therapy intervention – in the education of mothers-to-be and new mothers (parents) about the importance of supine positioning for optimal SIDS prevention (as well as other SIDS prevention recommendations). In this example, the mother-in-law may serve as a social environmental influence on the person, and this influence would impact the execution of the occupation of parenting. Further, the person's response or lack of response to the social environmental influence of the mother-in-law may also effect the occupations of parenting and infants.

### *Environment*

There are a multitude of environments that can be considered when looking at infant caregivers and their babies. Examples of these environments include, but are not limited to: physical, social, economic, and cultural. Each of these environments has the potential to enable or disable a person's occupational performance. Further, several different environmental factors can be contributing to occupational performance at the same time, over time, emphasizing the dynamic potential of this model in relation to infant positioning.

*Physical Environment*

The physical environment for caregivers and their newborn in this client-centered theoretical model would include such things as the infant's crib, changing table, use of the floor, playpen, bouncy seat, and car seat. There are two issues that are significant about the physical environment of the infant: global safety, including SIDS prevention, and the issues related to head shape, and risk for torticollis.

When examining the environment in terms of SIDS prevention, the crib environment could be made more or less safe depending on the presence or absence of pillows, blankets, and other objects that could smother an infant. When looking at the potential impact of the physical environment on the shape of infants' skulls, according to Littlefield et al. (2003), there may be a positive relationship between the amount of time newborns are placed in bouncy seats, infant swings, and car seats and the incidence of cranial deformities. There might also be an impact between how infants are positioned and their acquisition of specific developmental milestones, such as rolling over and crawling. In reference to data suggesting a potential relationship between motor milestone changes and the sleep position, Dr. Catherine D. DiAngelis (quoted in Jantz et al., 1997), made the following statement: "The results show how 'normal' can be altered by changing the environment (p. 565)".

The significance of the physical environment is described from another perspective by Pierce (2000): "supporting infant play in the home is supporting infant development (p. 292)". In this study of mothers' management of home as a play space, Pierce acknowledges that mothers make conscious choices about issues such as how and

where to position infants in the interest of safety, comfort, and to provide stimulation.

The choices mothers make for the environments surrounding their infants (including positioning and the presence or absence of hazardous objects near the infants) seems to be related to the well-being of the infant. Thus, the co-occupations of parent and child of playing, feeding, resting, and sleeping may be influenced by the caregivers' interpretations of the Back to Sleep recommendations. The Back to Sleep recommendations state supine sleeping is best for SIDS prevention. (These recommendations are also part of the cultural environment.) Some parents of newborns over generalize this recommendation for positioning their newborns for sleep and awake time, avoiding prone positioning altogether.

Thus, in this example, the co-occupation of the parent and child may be altered by any combination of the following: the types of positioning education they may have received from their pediatric PCP, the parents' perceptions of the education they received from the PCP, and/or the parents' fear of SIDS. In this example, the infant is not provided an opportunity to experience prone positioning for play, which in turn may have an effect on their muscle development and skull formation.

### *Cultural and Social Environment*

In addition to the physical environment, the cultural and social environments seem to have an impressive impact on how newborns are positioned for sleep. According to Pollack and Frohna (2002), infants in large families were less likely to sleep supine than infants in smaller families. It is probable that the culture of a family may change in regard to how large the family is. It is also possible that some cultures may be more

likely to have larger families than other cultures. Pollack and Frohna (2002) report that African American infants were more likely to sleep prone and to live in large families, which is cited as a risk factor for prone sleep. Nelson, Yu, Wong, Wong, and Kim (2004) also note potential cultural environmental influences that may relate to motor skill acquisition. For example, as a culture, Hong Kong Chinese caregivers often do not provide “floor time” (which serves as an example of both physical environment and cultural environment) for their infants, and many of these infants never crawl. Prone sleep was also more common with infants from Arkansas, Florida, and Oklahoma (Pollack & Frohna, 2002). This could be reflective of culture, social, and/or socioeconomic environmental influences, the authors did not specify.

#### *Economic, Cultural, and Social Environment*

The increased incidence of prone placement of infants in low-income homes, as well as the increased use of prone based on cultural beliefs, represents the potential cultural and socioeconomic environmental influences on the Person and Occupation (as in the co-occupation of parent and child). In addition to the family member example of an environmental influence on positioning of infants, people that can influence caregivers and their newborns may include peers of the caregivers, physicians and nurses. Culturally, in the United States, there seems to be significant respect for information provided by PCPs. Sometimes the information provided by physicians and nurses is verbal, written, or by demonstration, all of which may impact the actions of infant caregivers. For example, in populations where caregivers are uneducated, comprehension of the recommendations may be limited. Colson, Bergman, Shapiro, and



Leventhal (2001) performed an investigation about parents' perceptions of the newborn nursery and how it affected the positioning of the infants after discharge from the hospital. Parents were influenced by the instructions provided by the physician or nurse, and were also influenced by how they witnessed their infant being positioned in the nursery in combination with the verbal education they received.

### *Occupation*

The occupational performance of the infant, that is their, engagement in a range of activities that support their development, such as, eating, sleeping, watching, playing, and social interactions emerges from the transaction between the infant and their various environments. Because very young infants are incapable of repositioning themselves, the occupational performance of young infants is always related to the infant's positioning. The co-occupations of infant and mother are described by Dunlea (1996), Fraits-Hunt and Zemke (1996), and Pierce (2000). Dunlea described "frequent chunks of joint attention (p. 228)" as being characterized by the infant-parent interactions. Examples of these types of interactions may include eye contact and the mimicking of facial expressions. There are choices the caregivers make about how they position their infant for these interactions; supine, side lying, or prone positioning. For example, they may position the infant laying supine on the floor while looking down at them, or place the infant prone, with the parent lying down in front of the infant or to the side of the infant.

Fraits-Hunt and Zemke described the importance of game playing in the infant-parent interactions. Game playing may also include the mimicking of facial expressions, and sounds. Game playing may also be done on a physical level, lifting the baby "up in

the sky.” Another example of physical game playing is encouraging the infant response to an object, for example, to turn his or her head towards a stimulating object. These physical interactions may also be performed in various positions; supine, prone, and side lying. A parent’s hesitation (which relates back to the Person component; the hesitation may be because of mood, or temperament of the parent) for alternative positioning with their infant during game playing may impact the dynamic, by allowing less variety in the game playing. Pierce describes the mothers’ juggling of occupations as a “dyadic interplay between the occupations of the mother and those of the infant and toddler (p. 297)”. Even if a mother is comfortable providing supervised prone positioning for play, there may not be as much time for “multitasking” for the mother when her infant is in prone positioning, since there is a need for close supervision when the infant is in this position. Thus, there are several issues related to infant positioning that directly impact the co-occupations of caregiver and child.

The co-occupation of parent and child is complex. Children learn from their environment. A child’s occupation may be impacted by opportunities (or lack of opportunities) provided by positioning choices made by the parent for sleep and supervised play. Further, caregivers’ occupations and roles in everyday living could have a dramatic effect on how the caregivers are able to carry out their occupation as the caregiver of a newborn. Larson (1999) explored the occupational science-based “orchestration of occupation (p. 269)” in mothers of children from a population of mothers parenting a child with a disability. In short, parenting is a complex, delicate juggling act with many simultaneously moving parts. Parents’ occupations and roles, and

the parents' perceptions of the importance and sequencing of occupations and roles, will likely be reflected in many aspects of infant care; positioning for sleep and awake times are one aspect.

The caregivers' engagement in occupations other than the complex occupations associated with the care of the infant is probably quite common. The value placed on occupations other than the infant-mother co-occupation may influence how caregivers of newborns perceive their caregiver roles. For instance, a parent of a newborn who has other young children at home may not perceive themselves as having time to provide supervised prone positioning; perhaps they find themselves caught up with the other children, housework, paid work, or other occupations. A parent who perceives themselves as overwhelmed with other occupations or activities may not prioritize providing supervised tummy time for their newborn; they may be preoccupied with other occupations. However, it is also possible that there could be an increase in unsupervised prone positioning of newborns secondary to outside influences on the occupation of parenting. As noted above, investigators found that infants in larger families may be more likely to be placed in prone for sleep (Pollack & Frohna, 2002).

When identifying the co-occupation of caregiver and child, it is clear that the actions of the caregiver may affect the child, and vice-versa. When looking at the occupation of the infant, it can be noted that when prone positioning is avoided altogether, there would be less variety in positioning options in a young baby, fewer opportunities to explore the environment from different positions, and fewer opportunities to strengthen upper body and extensor muscles. Further, if the caregiver

attempts to provide supervised prone positioning, and the infant protests, this would impact the caregiver as well. It may cause stress, and will likely decrease the amount of prone for play time the infant receives. It is up to occupational therapists and other health care providers to assess the person, environment and occupations and to create pleasant positioning alternatives for both caregiver and infant. This demonstrates the complexity of the transactional relationship between the components.

The transactional relationship between Person, Environments, and Occupations may be illustrated by the earlier example of the grandmother's potential influence on how infants are positioned in the home in the low-income African American population. One example of how the components of PEO can affect each other is described in the following summary: The way the Person (mother or dyad) perceives herself as a parent may influence how malleable she is to outside Environmental influences (grandmother), which in turn may have an effect on how the Occupation of parenting, and the Occupations of sleep and play are executed.

The PEO Model can be used by occupational therapists to organize and plan for research and intervention in complex public health issues, such as the impact on how infants are positioned for sleep and play and how this positioning seems to be related to SIDS, plagiocephaly, torticollis, and motor skill development. Occupational therapists could be key contributors to research and eventually impacting the education of infants' caregivers about positioning because of our appreciation for the complexity of the human condition and the consideration of context. The education about positioning of newborns

is important for: SIDS prevention; facilitative positioning for developmental milestones; and positioning to decrease the incidence of plagiocephaly.

### Conclusions

What can be inferred from the literature review is that although there has been a significant decrease in the rate of SIDS since the recommendations for SIDS prevention were implemented, there is a concomitant increase in the rate of plagiocephaly with and without torticollis. These negative side effects appear to be linked to infants receiving limited supervised prone positioning during the first few months of life, and excessive supine positioning, including too much time spent in positioning in devices. These positioning trends have developmental implications and therefore call for examination. There is evidence that there is a need for research related to what extent, how and why health care providers educate the public about supine and prone positioning. Occupational therapists' training and theoretical support for problem solving about complex health care issues can help fill that role.

## CHAPTER III: METHODOLOGY

The purpose of this study was to gain understanding about how and why primary care providers (PCPs) educate newborn caregivers about positioning. This is the first step to the development of a better understanding about the relationship between how infants are positioned for activities throughout the day, and infant development. Infant positioning has been linked to the etiologies of plagiocephaly (Argenta et al., 1996; Dube & Flake, 2003; Hunt & Puczynski, 1996; Kane et al., 1996; Littlefield, Kelly, Reiff, & Pomatto, 2003; Turk et al., 1996) and torticollis (Littlefield et al., 2001), and motor skill delays (Davis et al., 1998; Dewey et al., 1998; Jantz et al., 1997; Miller & Clarren, 2000; Ratliff-Schaub et al., 2001; Salls et al., 2002). This first step could help in the future identification of roles for occupational therapists in either prevention of plagiocephaly and torticollis or early intervention with infants developing these conditions.

### Research Questions and Hypotheses

#### *Research Question 1*

What do PCPs report regarding the provision of caregiver education about infant positioning for sleep?

#### *Hypothesis 1*

The majority of PCPs are educating parents about recommendations for supine sleep positioning.

*Rationale*

In light of the apparent success of the SIDS Back to Sleep campaign, with a 40% decrease seen in the SIDS rate since its implementation, it seems logical that a majority of PCPs are following the recommendations for supine sleeping positioning when educating parents. Further, the American Academy of Pediatrics Task Force on Sudden Infant Death Syndrome released an updated policy statement October 2005, reiterating the recommendation for supine sleep positioning. The guidelines do not specify when/if anytime in the first year prone positioning for sleep is acceptable. In the process of answering this overarching question, the following sub-questions will be included in this exploratory inquiry:

- To what extent are PCPs educating infant caregivers about positioning for sleep?
- What methods do PCPs use to educate caregivers of infants about positioning for sleep?
- At what age do PCPs feel safe recommending prone positioning for sleep?
- When do PCPs begin to address sleep positioning of the infant with the caregiver (at birth, 2 weeks, 4 weeks...)?
- Is there a relationship between the year the PCP began practicing and recommendations made for positioning for sleep?

*Research Question 2*

What do PCPs report regarding caregiver education about infant positioning for awake (or play) time?

*Hypothesis 2*

The majority of PCPs are not educating parents about recommendations for awake positioning.

*Rationale*

Anecdotal clinical evidence supports education to parents for supervised tummy time in babies; however this is not backed by research. While the October 2005 American Academy of Pediatrics new guidelines call for supervised prone positioning, the guidelines do not quantify how much prone positioning is recommended per day. Further, there is not research-based evidence to be used as a practice basis for recommended supervised prone positioning of infants. The following sub-questions will be included in this exploratory inquiry:

- To what extent are PCPs educating infant caregivers about positioning for awake time?
- What positions are PCPs recommending to caregivers for infant awake time?
- At what point in the infants' development do PCPs make recommendations about positioning during the time the infant is awake?
- What reasons do PCPs provide for addressing positioning during waking hours?
- To what extent do PCPs report they provide infant caregivers with education about positioning to promote play?
- What methods do PCPs use to educate caregivers of infants about positioning for awake time?



- Is there a relationship between what PCPs report as influencing *why* they provide positioning education for awake time and the education they provide for awake time?
- Is there a relationship between the year the PCP began practicing and recommendations made for awake (play) time of the infant?

### *Research Question 3*

Is there a relationship between PCP practice site and the types of education they provide for sleep and awake positioning?

### *Hypothesis 3*

There is not a relationship between where a pediatric PCP practices (family practice vs. pediatrics only, and location as far as metropolitan, rural, or suburban) and the types of education they provide about sleep and awake positioning.

### *Rationale*

It seems that the setting in which a pediatric PCP practices should not influence decisions made for educating caregivers about positioning for sleep and awake time. The standard recommendations in healthy, full term infants are to place the babies supine for sleep. However, the literature reflects potential discrepancies in how sleep and awake positioning have been discussed with caregivers. Information from nine offices was solicited, with a total of 12 office sites. The PCP offices for this study were chosen because they offered a cross section of this Southeast region in pediatric care.

### Subjects and Recruitment

The subjects in this study were sought from a potential pool of 89 PCPs. The initial goal was a convenience sample of at least  $n=50$  PCPs that provided care to infants. A high return rate was anticipated since there was going to be face-to-face data collection for the self-administered questionnaire. However, nine of out of the 10 participating offices opted for the option of receiving a \$5.00 Starbucks card for the PCPs in lieu of the lunch or snack with the face-to-face data collection. The cited reason for this choice voiced by office or nurse managers was due to asynchronous schedules of the PCPs at the offices. Appendix E shows the Amendment request that was submitted for VCU IRB # HM10108 for approval of asynchronous data collection. Despite the fact that there was not face-to-face data collection, a high rate of return was still obtained, with 66 qualifying PCPs participating in the survey.

There were fewer surveys solicited than is sometimes expected in questionnaire studies for several reasons:

- The process was labor intensive. While each survey was estimated to take the PCP approximately 10 minutes to complete, the student investigator spent approximately 1-2 hours for the formal solicitation of each site with phone calls, and face-to-face meetings with 11 of the 12 office or nurse manager at each of the potential sites, and multiple site visits. The student investigator made two return trips to nine of the 10 participating offices, and three return trips to the tenth participating office. The purpose of spending this face-to-face time with the office or nurse managers was in hopes of a higher response rate than if the

questionnaires were mailed to the PCPs. The investigator also had a chance to explain the purpose of the study, and the importance that the PCPs not collaborate when answering the survey so as to obtain the best data possible.

- The cost of the participation incentive also needed to be considered when soliciting participants; lunch or snack or \$5.00 Starbucks cards were offered to each potential participant at offices that agreed to allow the student investigator to solicit participation from the PCPs in the office. In offices where the PCPs chose the Starbucks gift cards, the student investigator thanked the office or nurse managers for collecting the completed surveys with a \$5.00 Starbucks card as well.
- Another consideration when initiating the study was the fact that PCPs are extremely busy, and may have been difficult to recruit for participation.

The subjects were recruited with initial phone calls to the office or nurse managers to nine different practices in the Southeast; offices are located in a metropolitan area and in a surrounding suburban and a surrounding rural town. Three of the offices that were solicited for participation offer separate satellite offices in other locations. In one of the family practice groups has a satellite office, the PCPs do not rotate offices; they are stationed at one office during all working hours. In two of the pediatrician offices, several (but not all) of the PCPs operate on a rotating schedule between offices.

The choosing of offices for recruitment was not randomized, so the information gleaned could not be able to be generalized. This is not to say that gathering this data

from participating PCPs could not lend information for future study in this area. While the recruitment was not randomized, it was systematic. Each of the chosen offices represented:

- Range in size; the offices chosen range from three to 16 participant-eligible PCPs.
- A mix of pediatrician and family practice that were solicited for participation to contribute further to demonstrating a cross section of participants with various backgrounds and environmental and/or professional influences on how and why they educate infant caregivers about positioning.

In addition to these variable features, there are two large hospital systems that serve much of the Southeast area where this study took place. In order to maintain anonymity, the hospital systems will be referred to as Hospital System A and Hospital System B.

Hospital System A is a large, public hospital system that operates under its own Authority System, meaning it operates under its own revenue, but not-for-profit.

Hospital System B is owned by a private, not-for-profit organization. Out of the nine practice sites, two are pediatrician offices with Hospital System B. Three of the pediatrician offices are affiliated with Hospital System A. One family practice with Hospital System B, one family practice from Hospital System A, and there are two independent pediatrician offices (not directly affiliated with either hospital system).

While there should not be any major differences found based solely on practice affiliation, this differentiation may provide more of a cross section of the population in this region as both private and public institutions are represented in the study.

The offices chosen serve multiple socioeconomic statuses (SES), as they are located in proximity to three different defining areas, as noted in Table 1.

Table 1

*Median Income of Areas of Study in Comparison to National Average Median Income*

Location	National Average Median Income	Median Income reported	Population  (data as of date collection date not retrieval date)
Metropolitan Area	\$41, 994	\$46, 975	540, 828
Outlying rural Community within 15.32 miles from metropolitan area	\$41, 994	\$38, 261	3, 449
Suburban Community within 11.29 miles from the metropolitan area	\$41, 994	\$67, 034	22, 127

Information retrieved November 4, 2005 from <http://www.census.gov>

While \$38,000 is not anywhere near the poverty level, the different socioeconomic statuses may illustrate differences in lifestyle in the geographic locations of the practice sites. While details about the relevance of SES are beyond the scope of this study, it is possible that anecdotal evidence from this study may provide information for future inquiry into this area. A more detailed description of the breakdown of PCPs in various practice setting is outlined in Table 2.

There were 13 potential non-specialized pediatric offices in the southeast region identified. Out of the 13, eight pediatrician offices were surveyed for this study,

Table 2

*Breakdown of Primary Care Providers in Various Settings*

Practice	Number of Pediatricians	Number of Physician Assistants	Number of Nurse Practitioners	Number of Family Medicine Physicians	Total
Pediatrician Metro, Rural, & Suburban - A	14	2	0	0	16
Pediatrician Metro A	6	0	2	0	8
Pediatrician Suburban & Rural -A	6	0	3	0	9
Pediatrician Metro - B	4	0	0	0	4
Pediatrician Metro – I	3	0	0	0	3
Family practice, Rural – A	0	2	1	7	10
Family practice Metro — B	4	0	0	2	6
Pediatrician Suburban – I	4	0	2	0	6
Pediatrician Metro – B	7	0	2	0	9
Pediatrician Metro – B	4	0	0	0	4
Pediatrician Suburban – B	10	0	0	0	10
Family Practice Suburban - B	0	0	0	4	4
TOTAL	62	4	10	13	89

*Note.* Metro = Metropolitan; A = Hospital System A; B = Hospital System B; I = independently owned (not directly affiliated with either hospital system)

representing nearly 50% of the practices in this region. However, there was less opportunity to recruit family practice PCPs serving infant caregivers than pediatrician practices; in order for the facilities to qualify as infant care providers by the state where the study took place (and provide routine immunizations), they must meet quotas for how many infants they see per year (Devorah Werner, PA, personal communication, October 23, 2005). Three family practice offices in the areas where the study took place included PCPs who met the established criteria.

The investigator made contact with an office or nurse manager, described the purpose of the study, and agreed to provide lunch, a snack, or a \$5.00 Starbucks card in appreciation of the participants' time. The determination of whether lunch or snack, or Starbucks card were provided was made by the office or nurse manager. The researcher accommodated the most convenient time to visit the practice. Each of the managers received a follow-up phone call to confirm that the physicians, physician assistants, and nurse practitioners in the practice were willing to participate in this investigation, followed by an opportunity for the manager to read the questionnaire approved by the thesis committee and the Virginia Commonwealth University (VCU) Institutional Review Board (IRB).

Three of the above practices had more than one office site, with two of the three offering three office locations and a rotating schedule of physicians. The investigator scheduled these facility visits with the nurse or office manager/coordinator around this rotating schedule, to provide an opportunity for each of the PCPs to participate. Several site visits were necessary in order to have maximum participation. There were 89 PCPs

solicited for participation in this study, with a goal of a minimum of 50 participants. Introduction of the project, including information about approval of the study by the Virginia Commonwealth University Institutional Review Board, a description the waiver of informed consent, and distribution of the questionnaires took place during scheduled meetings with the office or nurse managers at each site. When distributing the surveys, the investigator had an opportunity for introductions, to explain the study, identify criteria for participation, and explain procedures to ensure protection of human subjects to the office manager. Following these visits, the investigator left the blank questionnaires in the office. The investigator stopped by each facility up to three times, and provided approximately two reminder phone calls to each facility for forms not yet completed. One facility requested self-addressed stamped envelopes be dropped off at the facility so the participants could mail outstanding surveys at their convenience. In accordance with this approval, the survey listed contact information for the investigator for the staff should they have had any questions after the data was collected. The proposal for this research was submitted for review and approval by Virginia Commonwealth University's Institutional Review Board following approval by the thesis committee.

### Instrument Preparation

Several drafts of the survey were executed prior to the product submitted for Institutional Review Board Approval. Charts were created to make sure each survey question contributed to a research question. Further, efforts were made to have complimentary questions about sleep and awake positioning to establish consistency of questioning.



A small field study of the instrument (Appendix A) was conducted with one family practice physician and one pediatrician to provide feedback from PCPs about how they found the questionnaire to read:

- Was the questionnaire easy to follow?
- Were any response sets missing?
- Were any response sets confusing?
- Were any questions difficult to understand?
- How long did it take to complete from start to finish?
- Any other suggestions?

One of the PCPs reported the questionnaire was reader-friendly and professional, and took about eight minutes to complete. This same PCP provided suggestions for collecting data from questions seven and eight, as well as for questions 15 and 16; originally PCPs were requested to write in their response to the rank order question. However, this PCP noted that many physicians have handwriting that is difficult to read, and suggested the use of numbers from the prior question. This and other feedback was incorporated into the final product. The other PCP reported the questionnaire took her 10 minutes to complete. She felt the response sets made sense to her, but also commented that there were “a lot” of response sets for each question. This PCP gave feedback about the wording of two questions, and this feedback was also incorporated into the final product.

The student investigator’s thesis committee and other faculty members from the occupational therapy department that were in attendance at the thesis defense in the fall

of 2005 provided constructive feedback about the wording of the survey questions at the, such as omitting questions that may have been interesting, but did not contribute to the scope of the study. An example of one of these questions includes the recommendation that specifics regarding types of board certification were removed from the survey; instead the simple question as to whether or not the PCP was board certified at all was left in its place. The thesis committee also provided feedback for the student investigator to make sure the questions were worded in a way that was easy to read for the participants. A follow up pilot study was conducted with three inpatient pediatric nurses. These participants provided feedback about the questionnaire specific to the response sets, questions, and length of time to complete the survey. The participants reported the survey took about seven to nine minutes to complete. Minor changes were incorporated at the recommendations provided by these participants; these minor changes included two typographical errors on the actual questionnaire.

### Data Collection

The data was collected in the form of a questionnaire with open and closed-ended questions. The questionnaire was anticipated to require less than 10 minutes for participants to complete. The survey design took into account the busy schedules of the participants, the need to gather only the essential data and to do so expeditiously.

Basic demographic information was collected including job titles and the year they began practicing (for physicians was identified as the year they completed residency). In many instances, the questionnaire offered the participants the opportunity to select multiple responses.

## Data Analysis

The survey was exploratory in nature and result are presented predominantly as descriptive statistics. Descriptive statistics are used to describe and organize data (Stockburger, 2001). The student investigator entered the data onto Microsoft Excel to analyze and report range, frequency, and percentages. SPSS was used for statistical analysis in instances when it was appropriate. The use of a calculator was used for some calculations; all calculations were checked using SPSS (retrieved from the World Wide Web on October 18, 2006 at <http://www.spss.com>).

There are several threats to internal validity that may affect the outcome of this study (retrieved from the World Wide Web on October 14, 2006 [http://www.une.edu.au/WebStat/unit\\_materials/c2\\_research\\_design/validity\\_threat\\_internal.html](http://www.une.edu.au/WebStat/unit_materials/c2_research_design/validity_threat_internal.html)):

- Selection bias is when more of one group participates than from another recruited group(s). In this study, there were more participants recruited from pediatrician offices than family practice offices because there was a higher availability of pediatrician office based PCPs that see infants under one year old than family practice PCPs who see infants under one year old in the area selected for the study. This must be acknowledged in the analysis and discussion phases of this study as well.
- Reliability of measures and procedures describes how consistency is necessary when providing instructions to all participants. In order to address this risk to internal validity, the primary investigator has scripted the

introduction and explanation of the survey that was read to the office managers and posted for the participants to read prior to participation.

There are also several threats to external validity that may affect the outcome of this study. These threats include:

- Questionable generalizability to PCPs around the country
- Questionable generalizability to PCPs in different settings
- Generalizability to PCPs that began practicing at different time periods

Unfortunately, due to the small sample size, the results from this study will not be generalizable throughout the United States. However, some information will be obtained about how generalizable, or how uniform the acts of educating infant caregivers for sleep and for play is in the particular community where the study will be conducted.

#### Timeline and Logistics

Communication of Institutional Review Board (IRB) approval for this study was received by the student investigator from the principal investigator on April 4, 2006. At this time formal solicitation from 12 practice sites was initiated. This formal solicitation included phone calls to all 12 facilities and face-to-face inquiry with 11 of the 12 facilities' office or nurse managers. During the phone calls and/or face-to-face inquiry the student investigator described the purpose of the study, the goal of participation from local Primary Care Providers (PCPs), and the request to sign the paper that acknowledged understanding that the study qualified for exemption according to CFR 46.11(b) by the Virginia Commonwealth University (VCU) IRB Panel C. Data collection ended on July 12, 2006.

### Ethical Issues and Bias

The physicians' names are not used in this study (or any other unnecessary identifying features or facts). Every effort has been made to avoid bias in the development of the questionnaire. Every effort was made during the execution of the inquiry, including when the researcher used the script (Appendix E) to introduce the study. The student investigator acknowledges bias in regard to beliefs about the need for prone positioning for developmental purposes and prevention of plagiocephaly and torticollis and made every effort at keeping these biases in check during data collection, analysis, and write up. The student investigator used her thesis advisor to discuss thoughts (as appropriate) about results collected from data retrieval in an effort to compartmentalize these ideas, to keep them separate from analysis.

### Resources and Costs

The investigator offered to bring lunch or a snack to the PCPs and staff on the first data collection day at each facility, or in lieu of lunch or snack, offices had the option of receiving a \$5.00 Starbucks card in appreciation of the participants' time. Most of the 10 participating offices chose the Starbucks gift card. Gas costs were estimated to be \$130.00 for driving to 12 different facilities, most for multiple visits. The breakdown of the costs is as follows:

- Starbucks: \$353.10
- Other food (Bagels, cookies): \$32.22
- Duplication of the survey; Kinko's, envelopes, stamps: \$148.19

Total: \$683.51

### Data and Safety Monitoring

All of the data was stored at the home of the investigator at 10422 Breamore Drive, Charlotte, North Carolina in a locked file cabinet. Upon final defense of the study, on November 6, 2006, the data was transferred to the office of the principal investigator, Dr. Shelly Lane, at 1000 E. Marshall Street on Virginia Commonwealth University's campus. The data will be stored there for three years time. Any publication that may ensue from the research will use the combined group data and subjects will not be individually identifiable. The confidentiality of the participants will be maintained at all times.

### Potential Risks

This was a minimal risk study. There is a very slight chance that PCPs may have found the questions uncomfortable to answer, if they felt their professional behavior is being questioned. Participants were informed that they did not have to answer any question making them uncomfortable. Participants were informed that they were permitted to skip questions on the questionnaires, and leave the study at any time. A waiver of a signed consent form was requested and received from the initial IRB proposal since agreement to voluntarily complete the survey indicated consent.

This was not a treatment study, and the participant was not expected to receive any direct benefits from his/her participation in the study. It is possible that the participants experienced indirect benefit to their clinical practice from participation in this study as the questions may have provoked the participants to think more about infant positioning after completing the questionnaire.

## CHAPTER IV: RESULTS

### Data Collection and Presentation

Inquiry into how and why pediatric Primary Care Providers (PCPs) educate infant caregivers about positioning was presented in questionnaire format. Each PCP participant completed a 26 question survey. The data presented in this chapter was collected from surveys that were completed by 66 pediatric PCPs. The pediatric PCPs included pediatricians, family practice physicians, physician assistants, and nurse practitioners.

All participating offices opted for asynchronous participation, citing the PCPs busy schedules, and the majority opted for the Starbucks gift cards over lunch or snacks brought to the office. The student researcher made an average of three on-site visits to each of the 10 participating facilities. These visits were typically between 10 and 30 minutes each, with the purpose of each visit to meet with either the office or nurse manager to solicit participation, to drop off surveys, and to retrieve completed surveys.

### Sample Demographics

The specific demographic characteristics of the pediatric primary care providers (PCPs) solicited for participation in this study are summarized in Tables 1 and 2, in Chapter 3. Twelve offices were invited to participate; survey responses were received from 10 of the 12. One of the offices that did not participate in the study did not have an

office manager and it was not possible to find a contact from whom to obtain permission to solicit participation at this office. The second office made the decision not to participate after one face-to-face meeting with the office manager; no specific reason was given. The office response rate was therefore 10/12, or 83%.

Sixty-seven completed surveys were collected from the 10 offices, out of a possible 76 potential participants. This translates to an adjusted response rate for PCPs from the 10 participating practices of 88%. However, only sixty-six of the 67 surveys met criteria for inclusion since one PCP completing a survey did not work with infants. Data analysis was therefore conducted on 66 surveys, representing approximately 87% of potential participants from 10 offices.

Two of the practices solicited for participation had offices in multiple areas that spanned metropolitan, suburban, and rural locations, representing nearly 33%, (n=25) of all PCPs in the 10 participating practices. Table 3 illustrates the participation rates from the solicited areas, and hospital affiliations.

Some practices were associated with one of two hospital systems, designated A and B. Other practices were independent of these systems. Total adjusted PCP participation from Hospital System A affiliated participating practices was 91.2% (n=31). The total adjusted participation from Hospital System B was 78.8% (n=26). Total adjusted participation from practices independent of either hospital system was 100% (n=9). The participation rates from metropolitan, suburban, and rural practices were calculated by taking the participating practices that had multiple practice areas into account for each location in which they provided services.



Table 3

*Primary Care Provider Participant Rates by Participating Offices*

Office Setting by Applicable Hospital Affiliation, Location	Potential Participants (n=76)	Actual Participants (n=66)	Participation Rates
Office 1: Hospital System A - Metropolitan, Rural, and Suburban	16	13	81.3%
Office 2: Hospital System A - Suburban, Rural	9	9	100%
Office 3: Hospital System A - Rural	9	9	100%
Office 4: Hospital System B – Metropolitan	4	3	75%
Office 5: Hospital System B - Metropolitan	4	4	100%
Office 6: Hospital System B - Metropolitan	6	6	100%
Office 7: Hospital System B - Metropolitan	9	9	100%
Office 8: Hospital System B - Suburban	10	4	40%
Office 9: Independent - Suburban	6	6	100%
Office 10: Independent - Metropolitan	3	3	100%
Total	76	66	86.8%*
* This represents the response rate for those offices that chose to participate. It has been referred to as the adjusted response rate in the text since it reflects only 10 of the 12 offices contacted.			

The participation rates for these locations were as follows:

- Metropolitan participation rate: 90.5%

- Rural participation rate: 88%
- Suburban participation rate: 78%

Table 4 provides the participation rates from the 10 offices that took part in the study by category of primary care providers. Participants included pediatricians, family practice physicians, physician assistants in pediatric offices, physician assistants in family practice offices, pediatric nurse practitioners, and family nurse practitioners. The first column shows the number in the potential pool of participants, and the second column shows the percentage and number of actual participants.

Table 4

*Primary Care Provider Group and Participation Rate*

Provider Group	Potential Participants (n=76)	Percentage of Participants from each potential Provider Group	Provider Group Representation from all study Participants (n=66)
Pediatrician	56	83.9% (n=47)	71.2%
Family Practice Physician	8	100% (n=8)	12.1%
Physician Assistant	4	100% (n=4)	6.0%
Nurse Practitioner	8	87.5% (n=7)	10.6%

Participation percentage rates were calculated within each provider group (for example, pediatrician, pediatric nurse practitioner, etcetera), and then calculated from the group of participating PCPs as a whole (n=66). When pediatricians and family practice physicians were combined, the medical doctors made up 84.9% of the sample. For

analysis, pediatric and family nurse practitioner categories were collapsed and physician assistant in pediatric offices and family practice office categories were collapsed secondary to small number of participants in each category.

Participation was strong regardless of whether offices were located in metropolitan, suburban, or rural areas. Likewise, there was relatively consistent participation regardless of affiliation with Hospital Systems or independent operation. There was no apparent difference in participation rates if the office was a pediatric office or family medicine office.

#### *Training Specific Information about the Primary Care Providers*

Fifty-five participants responded to the question that inquired as to whether or not they held board certification. Of these, 54 of the responses, or 98.2%, indicated they were board certified. In an effort to keep the survey concise, further inquiry into the board certification was not conducted.

The year training was completed was defined as the year the clinician finished final residency or clinical. None of the participants completed their training prior to 1960. The greatest number of participants, 40.9% (n=27), reported completing their training within the past 10 years. The majority of the respondents (56%) completed their training in 1992 or after, however, 44% of the sample completed their training prior to that time. This is noteworthy since 1992 is the year the Sudden Infant Death Syndrome back to sleep campaign was initiated, which seems to have had a significant influence on practice with infants. Table 5 details the frequencies of participants that completed their training during specified time periods.

Table 5

*Year Completed Training*

Year completed training	Representation of sample (percentages)
1961-1980	16.7% (n=11)
1981-1991	27.3% (n=18)
1992-present	56.1% (n=37)

## Study Findings

The survey responses were entered into Microsoft Excel and SPSS. Responses to questions with multiple response options were calculated manually for each potential response, and then checked with SPSS. The mode was calculated for the questions that allowed the participating PCPs to rank their top three choices. In some of the Tables provided, the percentages do not add up to 100%; it is either an indication that participants were allowed to select several choices for a particular survey question, or that the numbers in the columns did not add up to exactly 100% secondary to rounding. N = 66 unless otherwise specified.

*Reported Frequencies for Education of Positioning*

Participants responded to inquiry about the frequency with which they provide education to caregivers of infants for sleep positioning, awake and play positioning, and positioning in devices, such as infant car seats. These frequencies are shown in Table 6.

Table 6

*Report of Frequency that Primary Care Providers Discuss Positioning*

Frequency Choices	Sleep Positioning	Awake Time Positioning	Use of Devices
Never (0%)	0	0	9.1% (n=6)
Rarely (<10%)	6.1% (n=4)	9.1% (n=6)	9.1% (n=6)
Occasionally (10% to <30%)	3.0% (n=2)	7.6% (n=5)	22.7% (n=15)
Sometimes (30% to <50%)	1.5% (n=1)	1.5% (n=1)	13.6% (n=9)
Often (50% to <70%)	7.6% (n=5)	21.2% (n=14)	12.1% (n=8)
Most of the time (70% to <90%)	19.7% (n=13)	13.6% (n=9)	13.6% (n=9)
Almost all of the time (90% to <100%)	24.2% (n=16)	25.8% (n=17)	9.1% (n=6)
Always (100%)	37.9% (n=25)	21.2% (n=14)	10.6% (n=7)

*Frequency Participants Report Educating about Positioning for Sleep*

The majority of PCPs reported that they discuss infant positioning for sleep most of the time or more (70% to 100% of the time) (81.8%; n=54). Slightly fewer PCPs (62.1%; n=41) discussed positioning for sleep almost all of the time or always (90-100% of the time), and fewer than 10% of respondents reported rarely or only occasionally discussing positioning for sleep. Only three respondents stated they had someone else in the office educate caregivers about sleep positioning; one reported a nurse practitioner

had this responsibility, another noted that the nurse and PA have the responsibility in addition to the participating pediatrician filling out the survey, and the third respondent chose “other” but did not specify who was assigned that task.

*Comparison of potential influential factors in providers educating for sleep positioning.* A closer look at the data in this study leads to some additional information. Among the subgroup of PCPs reporting infrequency of sleep positioning education (n=4), 66.7% completed their training prior to 1992. Thus, while only a minority of the whole sample in this study rarely or occasionally provided sleep positioning education to caregivers, within that minority the proportion of PCPs educated prior to 1992 is high. Also within this minority, 66.7% (n=4) were from a single family practice site. These findings suggest that both the year graduated and PCP work site have potential influential roles on the frequency of sleep positioning education.

A binomial test demonstrates that for frequency responses of most of the time, almost all of the time, and all of the time there was not an equal split of responses; there was statistical significance for these groups' differences. There were fewer PCPs that indicated they educate about sleep positioning most of the time or almost all of the time than PCPs that did not educate with these frequencies. The good news is that there were more participants in the sample that responded they educate about sleep positioning all of the time than the amount of PCPs that did not indicate this response. Table 7 shows the binomial test for frequency of responses reported for sleep positioning education.

The Mann Whitney U test compares two independent samples (Salkind, 2004), typically categorical variables. In this case, PCPs that practiced in pediatric settings and

Table 7

*Binomial Test for Responses to Inquiry about Frequency of Sleep Positioning Education*

Frequency of Education		Category	N	Observed Prop.	Test Prop.	Exact Sig. (2-tailed)
Rarely <10%	Group 1	1	4	1.00	.50	.125
	Total		4	1.00		
Occasionally 10% to <30%	Group 1	1	2	1.00	.50	.500
	Total		2	1.00		
Often 50% to <70%	Group 1	1	5	1.00	.50	.063
	Total		5	1.00		
Most of the time 70% to <90%	Group 1	1	13	1.00	.50	.000*
	Total		13	1.00		
Almost all the time 90% to <100%	Group 1	1	16	1.00	.50	.000*
	Total		16	1.00		
Always 100%	Group 1	1	25	1.00	.50	.000*
	Total		25	1.00		

\* $p < .01$ 

PCPs that practiced in family medicine offices served as the categorical variables. While additional research will be needed to clarify this issue, as with a small sample, conclusions cannot be made, the results of a Mann Whitney U analysis indicates that there was a significant difference in the way participants working in pediatrician offices responded to inquiry about the frequency of sleep positioning education compared to how participants working in family medicine offices responded to this inquiry. Table 8 summarizes these differences.

The pediatrician-based participants reported they educate about sleep positioning “all the time” more often than the family medicine-based participants, and the family

Table 8

*Test Statistics by Grouping Variables: Pediatrician Office versus Family Medicine Office*

	Never	Rarely	Occas- sionally	Some- times	Often	Most of the time	Almost all of the time	Always
Mann-Whitney U	302.50	225.50**	280.50	297.00	297.00	297.00	291.50	198.00***
Asymp. Sig. (2-tailed)	1.000	.001*	.202	.655	.836	.891	.799	.032*

\*  $p < .05$

\*\* U = 225.50

\*\*\* U=198.00

medicine-based participants reported more “rare” frequency of education for sleep positioning than the pediatrician based PCPs.

There is contrast between the results from inquiry regarding sleep positioning education frequency and the potential influential roles of office site affiliation and year graduated and frequency of education for awake positioning. There was not a relationship in the data between year graduated and frequency reported for awake time positioning education, nor was there a relationship between office affiliation (pediatrician office versus family medicine office) and frequency reported for awake time education.

#### *Frequency Participants Report Educating about Positioning for Awake Time*

Although a majority of the participants reported educating caregivers about awake positioning, educating infant caregivers about awake positioning was done much less often. Only 40 respondents (60.1%) reported that they discuss infant positioning for awake time most of the time or more (70% to 100% of the time). Slightly under half of the PCPs discussed positioning for awake time almost all of the time or always (90-100% of the time) (47% of PCPs, n=31); and 16.7% (n=11) of respondents reported



rarely or only occasionally discussing positioning for awake time. None of the respondents reported they “never” provide education for awake positioning. While none of the participants reported they “never” educate about awake positioning, 6.1% (n=4) noted that they do not routinely educate caregivers about awake or play positioning. Four of the respondents to the awake education frequency inquiry elaborated on to their answers:

- One respondent that noted that he or she does not routinely educate about awake positioning, but someone else in the office does
- One of the respondents noted that a nurse does this education
- One respondent noted that an MD has this responsibility
- Two of the respondents noted that a nurse practitioner has this responsibility
- One participant wrote in “all” have this responsibility

*Frequencies reported for specific awake time positions.* All participants reported they educate about prone positioning for playtime within the first year of the infant’s life when the inquiry was posed in a yes/no format. However, when inquiry was more specific to the first 4 months of the infants’ life, and the PCPs chose which positions they recommend for infants’ awake time, they only picked prone 78.8% of the time. Despite these differences, PCPs did report recommending supine, prone, and side lying positioning for awake time in general. This question allowed participants to pick more than one response. Twelve (18.2%) of PCPs reported they recommend all three positions

for awake positioning. Table 9 reflects both how many times each position was recommended, as well as overall percentage for each choice.

Table 9

*Recommended Positions for Awake Time for Infants under 4 Months and the Percentages of PCPs Recommending Each Position*

Positions Recommended for Awake Time	Percentages of PCPs
Prone	78.8% (n=52)
Supine	60.1% (n=40)
Side lying	33.3% (n=22)

*Frequency Participants Report Educating about Positioning in Devices*

PCPs educate caregivers least often with regard to positioning in devices. When queried about the frequency with which they discussed time infants spend daily (sleep and awake time were not differentiated) in infant carriers, bouncy seats, or infant swings only 33.3% (n=22) of respondents indicated they discuss infants positioning in devices most of the time (70% to 100% of the time); of these 19.7% (n=13) reported they address infants in positioning devices almost all of the time or more (90%-100% of the time).

*Influences Impacting Education Provided to Caregivers about Positioning*

In addition to the frequencies reported about positioning education and of assigning and reflecting on the responsibility of educating about positioning for positioning, the providers responded to questions about criteria they use to determine permissible positioning with infants. The criteria identified by the PCPs was identified in

terms of influences for sleep positioning education, influences for awake positioning education, and influences for positioning in devices education.

*Influences on the Education of Caregivers about Positioning for Sleep*

Participants responded to inquiry about outside influences and infant-specific influences on why they educate infant caregivers about positioning for sleep. Outside influences were categorized for analysis as training, experiences, or interactions that impacted PCPs actions in educating infant caregivers that were independent of the age or development of the infant. Outside influences included general (not infant-specific) influences on how and why they educate caregivers about positioning for sleep and awake time. Examples of outside influences that could impact how and why PCPs educate about positioning include, but are not limited to: the influence of colleagues, professional journals, and knowledge of how positioning may affect infants' mortality or morbidity in the infant population. Infant-specific influences included the age of the infant and the infants' motor skills level. Other examples will be addressed and discussed as they relate more directly to the results from this particular study.

*Outside Influences on How Primary Care Providers Provide Sleep Positioning Education*

The strongest outside influences for the largest number of providers were guidelines from their professional organization(s) and concerns about SIDS. The very high percentages of PCPs citing these influences, 93% and 83% respectively, indicate their importance. Table 10 illustrates the frequencies of 10 potentially influential forces related to making sleep positioning recommendations. Although "continuing education courses" was ranked as one of the three most significant influences by participants, along

Table 10

*Influences upon Providers Provision of Education about Sleep Positioning*

Influences	Percentages
Guidelines from professional organization (for example, AAP)	92.4% (n=61)*
Concern about SIDS	83.3% (n=55)*
Pediatric education/training	59.1% (n=39)
Professional journals	45.5% (n=30)
Professional conferences/meetings	43.9% (n=29)
Clinical Experience	43.9% (n=29)
Continuing Education courses	42.4% (n=28)*
Professional colleagues	30.3% (n=20)
Caregivers' reactions/concerns	18.2% (n=12)
Influence from occupational or physical therapists	3.0% (n=2)

\*Identified as the top three reasons that influenced practices for educating caregivers about sleep positioning.

with professional guidelines and concerns about SIDS, this category did not net the most selections on the survey by the majority of providers. Thus, if a PCP identified continuing education as an influence for educating caregivers about positioning, the PCP felt this was a highly significant source of information. However, it was not one of the most frequently chosen responses. When given the opportunity to indicate other possible influences, none of the respondents indicated additional reasons that were not provided that influenced their education of caregivers about sleep positioning.

### *Specific Criteria for Prone Sleep Positioning*

Criteria providers use to assess and address recommendations for prone sleep positioning was queried. The specific factors that influence PCPs beliefs about the acceptability of prone for sleep are presented in Table 11.

Table 11

### *Influential Criteria for Permissible Prone Positioning for Sleep*

Criteria	Percentages
Infant's ability to roll supine to prone	60.6% (n=40)
Infant's ability to roll prone to supine	40.9% (n=27)
Age of the infant	27.3% (n=18)
Infant's ability to lift head in prone	15.2% (n=10)
Infant's ability to turn head side to side in prone	7.6% (n=5)
If caregivers believes prone for sleep is best for infant	4.6% (n=3)
If there is no family history of SIDS	3.0% (n=2)

It was evident from two sources, the question about influencing criteria and the rank order question, that the key factor influencing whether a PCP would support placing a child in prone to sleep was the child's ability to roll from prone to supine. When participants were asked to rank the top three most significant factors from first to third, the infant's ability to roll supine to prone occupied the first and second rank positions, followed by ability to roll prone to supine. As can be seen in Table 11, these two top ranked responses also accounted for the majority of responses. Another frequently cited

factor was the infants' age; a full 30% (n=20) of respondents reported they do not advocate prone positioning for sleep during the first year of an infant's life. A small percentage, 2.3% (n=3), of respondents indicated there were "other" reasons than the choices provided for determining if a infant should sleep in prone; specific reasons were not indicated.

Respondents were asked to consider age of the infant as an independent factor for determining when prone sleep positioning may be permissible. Table 12 details responses to this question by percentage of respondents.

Table 12

*Infant Age Pediatric Primary Care Providers Consider Prone Sleep Permissible*

Infant Age	Percentages
2 months of age	3.0% (n=2)
4 months of age	1.5% (n=1)
6 months of age	22.7% (n=15)
Not for the 1 <sup>st</sup> year of life	33.3% (n=22)
Other	39.4% (n=26)

None of the respondents indicated prone for sleep was permissible prior to two months of age. A small number of respondents, 4.5% (n=3), indicated that prone for sleep may be permissible as young as two or four months of age. A significant portion of participants, 22.7% (n=15), responded that prone for sleep could be recommended by 6 months of age.

Just over one third of participants stated they do not advocate for prone sleep positioning with infants in the first year of life. A slightly larger number of the PCPs surveyed did not seem to determine positioning for sleep recommendations by age of the infant alone; 39.4% (n=26) of respondents chose ‘other’ instead of selecting an age of the infant in response to this question. ‘Other’ responses elaborated included: “over eight months old,”; gastroesophageal reflux disease [sic], or “GERD”; and not instructing caregivers whose babies roll to prone during sleep to continuously flip them back over. PCPs that did select an age of the infant generally felt most comfortable recommending prone for sleep after 6 months of age.

#### *Influences on the Education of Caregivers about Positioning for Awake Time*

As was queried in regard to sleep positioning educational influences, providers responded to inquiry about potential influences guiding their decisions for the provision of awake positioning education of caregivers. Similar to the influences outlined for sleep positioning, those influences included outside potential influences on how PCPs educate, and infant-specific criteria that may influence education provided by PCPs to infant caregivers. Outside influences, independent of the age or development of the infant, were once again categorized for analysis as training, experiences, or interactions that impacted PCPs actions in educating infant caregivers.

#### *Outside Influences on Providers that Impact Awake Positioning Education*

None of the participants indicated that reasons other than those listed were influential to recommendations they provided for awake positioning of infants. Table 13 summarizes the outside influences on how PCPs provided information for positioning of

Table13

*Influences upon PCPs Recommendations about Awake Positioning of Infants*

Influences	Percentages
Concern about possible relationship between supine positioning and plagiocephaly and torticollis	72.7% (n=48)*
Clinical experience	71.2% (n=47)
Concern about possible relationship between prone positioning and motor development	56.1% (n=37)*
Guidelines from professional organization	45.5% (n=30)
Concern infant may spend excessive time in car seat, infant carrier, swing, or bouncy seat	42.4% (n=28)
Pediatric education/training	40.9% (n=27)
Continuing education courses	34.9% (n=23)
Professional conferences/meetings	33.3% (n=22)
Influence from occupational or physical therapists	27.3% (n=18)
Professional journals	22.7% (n=15)
Professional colleagues	21.2% (n=14)
Concerns about SIDS	18.2% (n=12)
Caregivers' reactions/concerns	18.2% (n=12)
Not typically discussed	4.6% (n=3)

\*Identified as most influential to practice for educating caregivers about awake positioning.

infants for awake time. Respondents were asked to choose all answers that applied.

Although “concern about possible relationship between prone positioning and motor development” was ranked as being one of the three most significant influences by



participants when they were asked to rank order significance of influential choices, this category was not selected by the majority of providers. This suggests that a significant number of those that did select “concern about possible relationship between prone positioning and motor development” as an influence to education of caregivers about awake positioning also selected this influence as one of their top three influences to practice. Thus, if PCPs saw this as an issue at all, they saw it as a significant issue.

#### *Specific Criteria for Awake Positioning Recommendations*

When respondents were queried about specific criteria for awake positioning, a full 80% indicated that they routinely educate caregivers of the need for supervised prone positioning during times when the child is awake, and that special criterion was not required to make these recommendations. Table 14 illustrates the circumstances influencing education of supervised prone positioning.

Table 14

#### *Criteria Influencing PCP Education about Supervised Prone Positioning*

Influences	Percentages
Routinely in all cases	80.3% (n=53)
When evidence of plagiocephaly is present	63.6% (n=42)
When evidence of torticollis is present	51.5% (n=34)
When there is evidence of risk for plagiocephaly, torticollis, or motor delays	45.5% (n=30)
When asked by caregivers about awake positioning	40.9% (n=27)
When there is evidence of developmental delays	19.7% (n=13)

It was interesting that only 60.6% of this same group of participants (n=40) placed the frequency they provide such awake positioning education at 70-100% of the time. Perhaps the participants that did not choose as high a frequency of providing education were indicating when they do provide awake positioning education it is not always prompted by specific criteria.

A majority of participants indicated that recommendations for awake positioning are made when evidence exists of either plagiocephaly or torticollis . Although “concern about a possible relationship between prone positioning and motor development” was ranked as one of the three most significant influences by participants in one instance, as noted in Table 14, the similar category of “developmental delays” was not chosen by the majority of providers (19.7%, n = 13). In fact, the lowest number of participants chose developmental delays as being influential in their decision to educate caregivers about supervised prone positioning.

In addition to these influences upon providers influencing education of caregivers about awake positioning, there are infant specific temporal issues that impact this as well.

Temporal influences were cited as impacting recommendations PCPs make about positioning during the time the infant is awake, such as the age of the infant. The participants were asked questions about when in the infant’s first year of life they feel supervised prone for play is safe to recommend to infant caregivers. There were a wide variety of responses to this question, but half of respondents reported that by 2 weeks of age they considered prone positioning to be safe when the child is supervised and nearly 75% concurred by 4 weeks of age. Smaller groups of respondents extended the time

period to 2, 4 and 6 months as the ages they considered supervised prone for play as acceptable. Table 15 summarizes these influences below.

Table 15

*Infant Age Primary Care Providers Report as Safe for Supervised Prone Positioning for Play*

Age	Percentages
At birth	37.9% (n=25)
2 weeks of age	12.1% (n=8)
4 weeks of age	24.2% (n=16)
2 months of age	15.2% (n=10)
4 months of age	15.2% (n=10)
6 months of age	12.1% (n=8)
Not for first year of life	1.5% (n=1)
Depends on infant's development	19.7% (n=13)
Other	1.5% (n=1)

*Influences on the Education of Caregivers about Positioning in Devices*

Sixty-one PCPs recorded responses as to why they inquire and educate about how much time per day infants spend positioned in infant carriers, bouncy seats, or infant swings (positioning devices). Five participants indicated reasons other than those provided on the survey. However, they did not elaborate on those reasons. A large portion of respondents reported that concerns about motor skill development was a contributing factor to their education of infant caregivers about positioning in these

devices (81.9% n=50), followed by 73.8% (n=45) of respondents citing concerns about plagiocephaly, and 63.9% (n=39) citing concerns about torticollis.

*When Providers Educate Infant Caregivers about Positioning*

Providers responded to questions about the point in time at which they discuss positioning for sleep and awake time with infant caregivers. Table 16 illustrates the responses provided.

Table 16

*Point in Time Primary Care Providers Educate Caregivers about Sleep and Awake Positioning*

Time when PCPs Choose to Educate Caregivers	Percentages for Sleep Positioning	Percentages for Awake Positioning
Initial visit in hospital	48.5% (n=32)	10.6% (n=7)
Initial office visit	86.4% (n=57)	50.0% (n=33)
First month of infants' life	77.3% (n=51)	63.6% (n=42)
Two month check-up	59.1% (n=39)	75.8% (n=50)
Four month check-up	40.9% (n=27)	50.0% (n=33)
Six month check-up	21.2% (n=14)	27.3% (n=18)
Nine month check-up	4.6% (n=3)	12.1% (n=8)
Continuously first year of life	13.6% (n=9)	15.2% (n=10)
Not routinely addressed	0	6.1% (n=4)

*When Providers Educate Caregivers about Sleep Positioning*

The majority (86.5%, n=57) of PCPs surveyed educate caregivers of infants about positioning for sleep at the initial office visit. The number of PCPs that reported they routinely educate about recommendations for sleep positioning during the first month of the infants' life was a close second in frequency; 77.3% (n=51). Nearly half (48.5%, n=32) educate about sleep positioning at the initial visit in the hospital. When looking at that number, it is important to keep in mind that not all of the PCPs surveyed have hospital privileges, and this may have influenced the frequency reported for this question. In other words, the frequency may not be a reflection as to whether or not this group of PCPs thought sleep positioning education was important during the initial hospital visit, as the question asked when the respondents routinely educated about sleep positioning. One thing was apparent, however, the first month of the infant's life (including the initial office visit) is seen as a key window for sleep positioning education.

Of the PCPs that responded, 13.6% (n=9) stated they continuously address sleep positioning throughout the first year of the child's life. This stands in contrast to the 30% (n=20) of PCPs reporting that they do not advocate for prone sleep throughout the first year of life. None of the respondents reported they did not routinely educate about sleep positioning.

*When Providers Educate Caregivers about Awake Positioning*

The largest majority of PCPs (75.8%, n=50) reported educating about awake positioning at 2 months of age, in contrast to the initial office visit as being the most popular time frame for sleep positioning. Initial office visits range from a few days after

discharge from the hospital to sometime within the first week following delivery.

However 50% did indicate that they address awake positioning during the initial office visit and 64 % reported doing this at the 1-month checkup. The responses to this question indicate that while positioning for sleep might take some precedence in the initial hospital and office visits that the majority of PCPs begin to discuss awake positioning with caregivers early in the first year of life. Of the 66 participants, 15.2% (n=10) note that they continuously educate about positioning for awake time throughout the first year, similar to the 13.6% (n=9) that reported they educate about sleep positioning throughout the first year of life.

*Methods of Education Employed to Infant Caregivers about Sleep Positioning*

All respondents reported using verbal recommendations to educate caregivers about sleep positioning. Almost half of the respondents (n=34) reported that in addition to verbal recommendations they use handouts or pamphlets. Only two respondents also reported referring caregivers to websites for information about sleep positioning.

*Methods Primary Care Providers use to Educate about Awake or Play Positioning*

The majority of PCPs use verbal recommendations (n=65), and a substantial number use verbal recommendations in combination with other methods to educate caregivers of children under one year old about positioning for awake (or play) positioning. Just over one third of respondents reported that they utilized handouts or pamphlets for educating about awake positioning (36.4%), and only 1.5% reported recommending websites to educate about awake positioning.

## Summary

PCPs are educating caregivers of infants about sleep positioning with a high degree of frequency. The providers are doing this education within the scope of the AAP recommendations. Awake positioning and the use of positioning devices are not addressed with the same frequency. Temporal influences vary for these recommendations as do the external influences cited by the PCPs that impact decision making and execution of positioning education. Discussion of these findings follows in Chapter 5.

## CHAPTER V: DISCUSSION

This investigation explored why and how pediatric primary care providers (PCPs) educate infant caregivers about positioning for sleep and awake time, as well as why they educate about time spent in positioning devices. Overall, results from this study suggest that while educating for sleep positioning is conducted with regularity by PCPs, education for positioning during awake times, as well as education on the use of positioning devices, is presented with less consistency. A role for occupational therapy in this educational process is explored.

### Why and How Primary Care Providers are Educating about Sleep Positioning

All PCPs surveyed in the current study discuss sleep positioning with at least some of the caregivers of young infants in their practice; over 80% of the PCPs reported engaging in this discussion with infant caregivers at routine well baby check-ups 70% of the time or more. The rationale behind sleep positioning education to eliminate one probable risk factor for SIDS in infants has been established; the decrease in the incidence of SIDS occurs concurrently with a decrease in frequency of prone sleep positioning (American Academy of Pediatrics Task Force on Infant Sleep Position and Sudden Infant Death Syndrome publication [AAP Task Force], 2005). However, the literature suggests that there may still be inconsistency with how and when infant caregivers are educated about



sleep positioning, as well as how the caregivers actually position their infants for sleep and to some extent this was substantiated in the current study. As noted by Adams, Kugener, Mimiran, and Ariagno (1998), one potential reason for this inconsistency may be a lack of universal standardized instructions regarding sleep positioning upon infants' discharge from the hospital.

SIDS prevention includes education about the probable relationship between prone sleep positioning and increased risk of SIDS as well as recommendations for supine sleep positioning. While the literature suggests this education is not done consistently throughout the United States, it is noteworthy that the vast majority of participants in this study reported that they educate caregivers of infants about sleep positioning with a very high level of frequency.

Participants cited guidelines from professional organizations, concerns about SIDS, and continuing education courses as most influential to their practice of why they educate caregivers about sleep positioning. As would be expected, this suggests that the majority of participants are aware of the relationship between infant positioning and SIDS, and that the participants were open to education from their professional organizations and continuing education courses to impact their practice. PCPs' professional organizations (such as the AAP) and continuing education courses acknowledge the significance of positioning for sleep and the risk of SIDS.

In addition to being responsive to these educational and societal influences, PCPs also indicated that they are grading their recommendations for sleep positioning based on what is developmentally and age appropriate. A substantial number of respondents chose

“other” instead of selecting an age for prone sleep recommendations. A few of the PCPs wrote in answers, including the fact that some do not instruct caregivers whose babies roll to prone during sleep to continuously move them back to supine throughout the night. Unfortunately, the majority of the respondents that chose “other” did not elaborate as to what other criteria they use to determine permissible prone sleep, although their answer suggests that they use other criteria to determine positioning for sleep recommendations than the age of the infant alone.

While the most recent statement (October 2005) from the American Academy of Pediatrics Task Force on Infant Sleep Position and Sudden Infant Death Syndrome Policy Statement reinforces supine positioning for sleep, there is not an indication or explanation of when in the infants’ first year of life, if ever in this time frame, prone sleep may be considered permissible. Clinical and personal experience with infants less than one year of age led the student investigator to question: When in the first year of life do pediatric PCPs find prone positioning for sleep permissible?

The earliest any of the participants indicated permissible prone positioning for sleep was two or four months of age. Since, statistically speaking, the risk of SIDS peaks between two and four months of age (AAP Task Force 2000; Fleming et al., 1996), it was a bit surprising that any of the participants selected these choices. It is possible that the participants that selected four months of age were anticipating that an infant would be able to roll from prone to supine by this time, as the traditional “typical” age for reaching that milestone has been four months. However, since the implementation of the SIDS prevention campaign, there has been documentation of a delay trend in the achievement

of some of these motor skill milestones (Davis, Moon, Sachs, & Ottolini, 1998; Jantz, Blosser, & Fruechting, 1997). In a retrospective chart review conducted in a pediatric private practice Jantz et al. found that infants between the ages of 4 to 6 months, who slept supine, were more likely to roll from supine to prone before prone to supine. Further, clinical and personal experience have allowed the student investigator to observe that infants are rolling later than four months of age – some as late as seven months of age-- and to observe that many infants learn to roll from supine to prone prior to prone to supine.

Almost one-quarter of the participants responded that prone for sleep could be recommended by 6 months of age. This response seemed appropriate for typically developing, healthy babies; they are more likely to be able to roll over by 6 months of age, and according to the literature, the risk of SIDS begins to decline after 4 months of age.

A fairly large number of participants (n=22, 33.3%) in this study indicated they do not advocate for prone sleep positioning within the first year of the infant's life. While the wording of this question did not request a rationale for these recommendations, it is reasonable to assume that these participants are responding to the SIDS prevention recommendations verbatim. These recommendations, developed by the American Academy of Pediatrics, indicate back to sleep for the first year of life. While these respondents may not endorse prone sleep during year one, it is unclear to what extent they express this belief to caregivers.

In addition to the inquiry about infant's age as a factor in sleep positioning recommendations, participants responded to observable skills that could influence their recommendations for sleep positioning. As discussed, participants put the infant's ability to roll supine to prone at the top of their list for criteria, followed by whether or not the infant could roll prone to supine. Logically, the infant's ability to roll prone to supine could be more viewed as more critical when looking at SIDS prevention, as this would imply that the infants had the ability to get off their tummies and to clear their airway. Perhaps the PCPs were implicitly acknowledging the new trend in motor skill attainment of rolling supine to prone before prone to supine referred to above. Alternatively, this response choice may reflect the fact that once an infant can roll supine to prone it does not seem reasonable to ask the caregivers to continuously flip the infants' over throughout the night. As mentioned earlier, research by Jantz et al. (1997) did find that infants who slept supine were more likely to roll from supine to prone before prone to supine.

A very small number of respondents reported they only rarely or occasionally provide sleep positioning education at all (9.1%, n=6). Within this group there was representation from affiliation with each hospital system as well as an independent practice, and from both physicians and PAs. While the PCPs who chose not to discuss sleep positioning with caregivers are not grouped into a single profession or a single type of practice, as discussed, a substantial portion of the PCPs that rarely or occasionally provide sleep positioning education (two-thirds) were from a family practice setting. This indicates there might be an increased need for education with PCPs in this setting.

While the proportion of PCPs not educating for sleep positioning is small in this study it is surprising that any of the providers chose this response at all. It is unlikely healthcare providers would be unaware of the relationship between sleep positioning and the risk of SIDS. This suggests there is more to learn about a potential relationship between PCPs training and affiliation, and their provision of positioning education.

SIDS prevention education has a history that dates back at least 15 years. The most significant timeline points include:

- 1992, the first year the American Academy of Pediatrics announced recommendations for positioning healthy infants in supine or side lying for sleep;
- 1994, when the official SIDS “Back to Sleep” campaign was initiated to educate the public and health care providers about positioning recommendations;
- 2005, when the recommendations were altered slightly with advice to change from back or side lying sleep position, to back sleep positioning only.

Given the strength of the established link between prone sleep position and the development of SIDS (Delzell, Phillips, Schitzer, & Ewigman, 2001; Fleming et al., 1996; Lockridge, Taquino, & Knight, 1999), no PCP should omit discussion of sleep positioning from their interaction with new caregivers. That some continue to do so suggest that there is some professional educating still to do. The fact that there were a disproportionate number of PCPs from family medicine offices reporting they do this education with less frequency than PCPs at pediatrician offices suggests more research is

needed in this area to learn more about which medical professionals are most in need of professional educating about the provision of sleep positioning education.

As far as how the PCPs are providing their education about sleep positioning, most are using verbal recommendations for educating about sleep positioning. While there is consistency in this method, this finding indicates that there is room for the PCPs to branch out to more current forms of media, such as electronic mail, and informational websites. These current forms of media could be quite effective with current childbearing-age adults. According to Hanauer, Dibble, Fortin, and Col (2004), young adults between the ages of 18-29 years of age represent the largest portion of online health information seekers, comprising an estimated 66% of online health information seekers. A YAHOO press release from July 24, 2003 announced that teens and young adults aged 13-24 are “born to be wired,” dubbing this generation as the “First Wired Generation (retrieved September 21, 2006 from the World Wide Web at <http://docs.yahoo.com/docs/pr/release 1107.html>)” after their two-phased market research study. Therefore, PCPs should be aware that current and upcoming generations of infant caregivers are increasingly likely to seek out information on the World Wide Web, and they might be most receptive to receiving information from healthcare providers directing them to websites with reliable information. In fact, it is increasingly important that PCPs become more familiar with the resources available on the World Wide Web, so they can direct the internet surfing caregivers are likely to do. According to Crocco, Villasis-Keever, and Jadad, “The Internet’s capacity for harm is likely to be equal to or exceeded by its capacity for providing good and useful health information to users in a relatively

inexpensive and timely manner (2002, p. 2870)". With this said, healthcare professionals should familiarize themselves with the information available on the web, know how to assess its validity and reliability, and exercise caution with referring clients to websites. In December 1996, Ojalvo, a healthcare freelance writer, offered online advice to consumers to minimize the risk of obtaining false information. Ojalvo includes basic quality checks such as examining credentials of information providers on the web and checking the publication and update dates (retrieved from the World Wide Web on September 22, 2006 from <http://www.acponline.org/journals/news/dec96/cybrquak.htm>).

#### Why and How PCPs are Educating about Awake Positioning

Inquiry about awake time revealed a variety of responses. Just under half of the PCPs reported they educate about awake positioning with infant caregivers with a high frequency (90 to 100% of the time). Awake time refers to the time the infant is not sleeping; the infant may be eating, crying, quiet and alert, and taking in their environment and surroundings using their developing sensory systems during awake time. When the inquiry was more specific to play time (during awake time), but not as specific to frequency, all of the participants responded that they educate about tummy time (prone) for play time with children under 1 year old at some point in their practice. Play time here refers to specific instances, with goal-oriented interactions, where the caregiver is eliciting play responses and interactions with the infant during awake time, such as when the caregiver actively engages the infant with auditory or visual stimuli, and encouraging reciprocal responses from the infant.

While all participants reported they educate infant caregivers about prone for play at some point in their practice, over 20% less of the participants (78.8%) selected prone positioning when a total of three positioning choices were offered for awake time. There could have been a few reasons for this discrepancy;

- The semantics for these two questions may have facilitated the differences in responses (“tummy time for playtime” in contrast to “prone for awake time”);
- The inquiry about prone for play was quite open-ended, it inquired if the PCP “ever” educates caregivers of infants under one year old about prone for play;
- The question that allowed the PCP to choose positions for awake time specified the question referred to recommendations for infants under 4 months of age, a much smaller time frame.

In addition to these variable responses about awake time, it is also noteworthy that there was a disparity between the reported frequencies of education for sleep in comparison to the positioning education for awake time positioning. PCPs are educating about sleep positioning with significantly more consistency than awake positioning. This disparity is representative of the fact that public health matters are complex. When addressing one public health issue, such as infant positioning for sleep to help prevent SIDS, there is potential to impact other health issues, such as infant positioning for awake time. This second issue, positioning for awake time, has the potential to impact other health and development issues, for instance the development of plagiocephaly, torticollis, and developmental delays (Davis, Moon, Sachs, & Ottolini, 1998; Golden, Beals, Littlefield, & Pomatto, 1999; Yu, Wong, Lo, & Chen, 2004). Thus, while omitting



education for sleep positioning can have an effect on infant mortality, omitting education for awake positioning can have an effect on infant morbidity. Further, while the AAP Task Force reports directly address sleep positioning, they are vague on the issue of awake positioning.

PCPs that do provide awake positioning education are making appropriate recommendations for prone; all participants recommend supervised prone positioning. Supervised prone positioning can be beneficial for strengthening of extensor muscles in the back, shoulder girdle, and neck as the infant often responds to this position by lifting his/her head against gravity in prone, learning to initiate pushing through the arms and shoulders in prone, and learning to turn the head side to side. Supervised prone positioning also is beneficial for front and back neck muscle stretching and strengthening, especially of the sternocleidomastoid muscles that can become tight with prolonged supine positioning (Biggs, 2003; Jones, 2003). Further, prone positioning offers a reprieve from the pressure on the infants' malleable skull. One AAP caregiving publication (The American Academy of Pediatrics, 1998) briefly advises the caregiver to "Try placing her on her stomach, and see what happens (p. 173)" and describes how this position helps strengthen the back of the neck. However, this positioning was not highlighted under the punch list of "Toys and Activities" recommendations for ages one to three months of age in this chapter. At the time of this caregiving publication, supine or side lying sleep positioning were acceptable in contrast to the October 2005 AAP Task Force revision that advocates for supine sleep positioning only. Since this change decreases the variety of positions permissible for infant sleep, it is now imperative that

infant caregivers are reminded to provide a variety of positions for their infants. Both the 1998 AAP publication and the revised edition of the AAP publication (2004) tells the reader that most infants roll from prone to supine before supine to prone, but either way is “normal.” This information is interesting when recalling what Jantz et al. (1997) found in the study discussed earlier; that infants who sleep in supine were more likely to roll from supine to prone before prone to supine. Considering the recommendations for exclusive supine sleep for SIDS prevention, it is likely that more infants would roll from supine to prone before prone to supine.

Littlefield et al. (2003) indicate that some infants receive a surplus of supine positioning between the supine sleep recommendations and use of positioning devices by many caregivers. Perhaps it is due to this knowledge that some infants may receive a significant amount of supine positioning that substantially fewer PCPs, almost a fifth less, reported they recommend supine positioning for play in comparison to the reports of prone positioning education for play. However, efforts to compensate for increased supine positioning secondary to SIDS prevention recommendations and concerns about plagiocephaly should not completely overshadow the fact that supine positioning does offer some developmental benefits:

- Visual tracking
- Eye coordination, such as the development of convergence and divergence
- Eye contact, including social and emotional developmental abilities (The American Academy of Pediatrics, 1998).

Only a third of the PCPs reported they recommend side lying for infants' supervised awake time. Clinical experience suggests that side lying can offer variety for infant positioning, as well as the potential for other benefits:

- Stimulating the vestibular system
- Gravity can provide a gentle stretch to the sternocleidomastoid muscles, which may be especially beneficial in infants prone to (or demonstrating) torticollis
- Side lying also impacts vestibular-visual systems as infants system learns to coordinate information from different positioning.

A variety of positioning is ideal for infants as, in addition to the muscular, vestibular, visual, and social benefits described, the variety of positioning activates proprioceptors in the joints and muscles throughout the body.

It is possible that some PCPs wait for signs of plagiocephaly and/or torticollis to initiate a discussion about awake positioning caregivers. In the spring of 2005, interviews with the family practice physicians described influences that impact how and why they educate infant caregivers about positioning illustrate this point. In the interview with Dr. M, he states that positioning education is typically done when an "issue" arises (Choffin, 2005). This wait-and-see approach is not ideal, since the progression and sometimes initiation of plagiocephaly and/or torticollis may be preventable with early preventative education. Hutchinson, Thompson, and Mitchell (2003) identified that infants diagnosed with plagiocephaly were less likely to experience daily prone positioning by 6 weeks of age. These investigators inferred from their study that

plagiocephaly may be preventable, or less severe when present, if infants are given daily supervised prone positioning opportunities.

As discussed, PCPs in this study responded inconsistently to the age at which prone positioning for supervised play is acceptable. As previously discussed, Dr. T stated that prone for play is acceptable when the infant demonstrates head control during well baby check-ups, and that it is typically recommended when the infant is 3 or 4 weeks old. In contrast to Dr. T, Dr. M stated prone for play was acceptable “anytime” (Choffin, 2005, p. 30). The perspectives expressed by both of these physicians support the answers provided in this study.

As was the case with educating for sleep positioning, PCPs employed primarily verbal education when discussing awake positioning with caregivers. PCPs may also find benefit to expanding their educational methods to include contemporary modalities for the education of awake positioning as was suggested above for sleep positioning.

#### When Primary Care Providers Routinely Educate about Sleep and Awake Positioning

The PCPs responded to inquiry about when in the first year of life they provide education about sleep and awake positioning, as illustrated in Table 16. It was interesting that the highest frequency reported for sleep positioning education occurred at the time of the initial office visit, and the highest frequency reported for awake education positioning education occurred later, at the 2 month old check-up. Both education for sleep and awake time begin to taper off around the 6 month old check-up. Figure 2 illustrates the

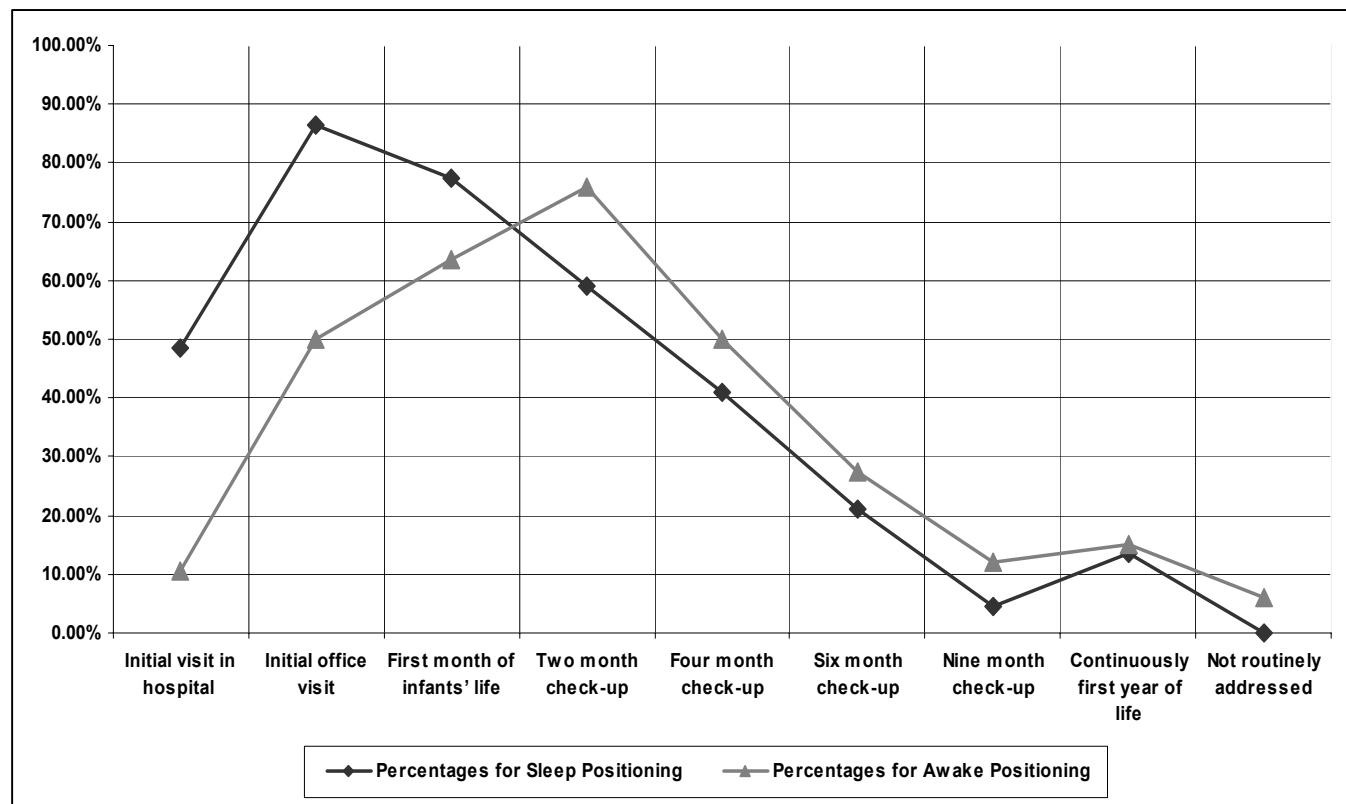


Figure 2

*When PCPs Routinely Educate about Sleep and Awake Positioning*

differences in frequencies reported for sleep and awake positioning for different time periods in the first year of the infants' life. Perhaps the reasons for these differences were due to the PCPs initial concerns for the infants' safety and survival with sleep positioning recommendations, followed by later education to promote the infants' overall development.

#### Why PCPs are Educating about Time Infants Spend in Positioning Devices

Only twenty-two (33.3%) out of 66 participants reported educating about positioning in devices at least 70% of the time. This finding is of concern as the excess use of car seats, swings, and bouncy seats is associated with plagiocephaly (Timothy Littlefield, personal communication, November 4, 2005; Littlefield et al., 2003). In many infants with positional plagiocephaly, the skull can be seen to mimic the shape of the car seat or positioning device of choice; for example, the flattened areas of the skull coincides with where the head rests in the car seat. Littlefield drew analogies between the overuse of positioning devices and the cradle boards used by Native Americans for purposeful cranial molding (Littlefield, et al., 2003). Unfortunately, the current use of devices often leads to non-purposeful cranial molding. In a three-year study, Littlefield and colleagues explored the relationship between the amount of time infants seen for plagiocephaly in his clinic spent in positioning devices, and the presentation and severity of plagiocephaly. The severity and type of cranial molding seen was noted to be related to how much time per day the infants spent in the positioning devices (Littlefield et al., 2003).

Sweeney and Gutierrez (2002) list the following to contribute to the risk of plagiocephaly in the premature infant population: supine sleeping position, excessive use of infant car seats, and a lack of prone play can contribute to plagiocephaly. In the current study participants were quite varied in the frequency with which they discussed with caregivers the use of positioning devices such as infant carriers and bouncy seats. Sleep and awake time were not differentiated in this inquiry, and PCPs were not queried specifically on any single device. It is interesting that a focus on use of positioning devices was uncommon in this group, and time spent discussing use of devices was considerably less than time spent discussing either sleep or awake time. Figure 3 illustrates the differences in the frequencies of education provided for sleep, awake time, and time spent in positioning devices.

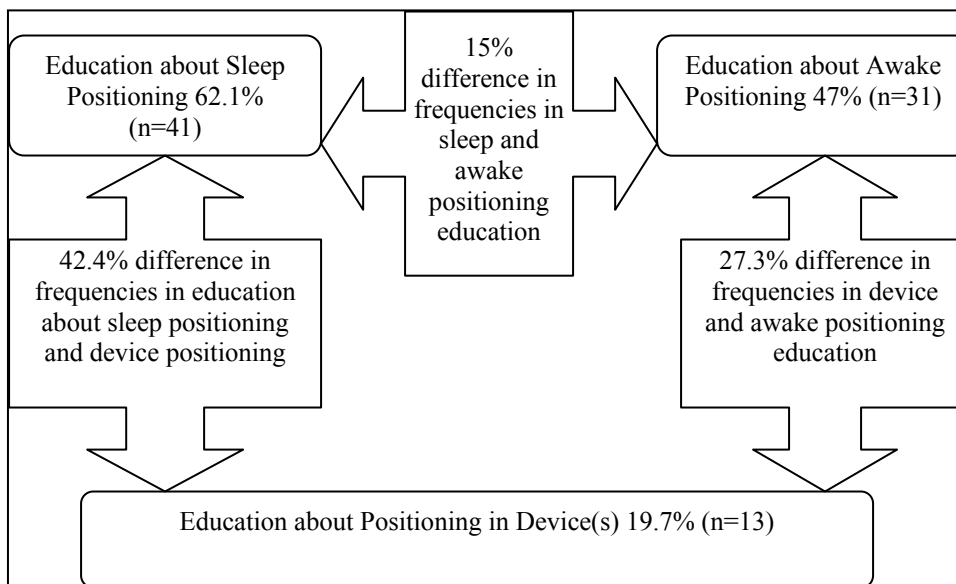


Figure 3

*Differences in Frequency of Positioning Education for Sleep, Awake, and in Device*

*Note.* Calculations were based on participants' responses for all of the time or always educating about positioning (90% to 100% of the time)

It is possible that during well baby visits, the PCPs assumed the basic discussion of positioning for sleep and awake time precluded the need to address the use of devices. Alternatively, this group of PCPs may not have been aware that the risk of positional plagiocephaly was associated with an excess of time spent in positioning devices. It may be useful for pediatric PCPs to think of time spent in positioning devices separate from infants' general sleep and awake positioning.

Such a focus is crucial if one considers the risk of developing plagiocephaly and/or torticollis (Littlefield et al., 2003). This could be an area for occupational therapy to provide preventative education to caregivers about limiting the amount of time infants spend in positioning devices per day and about alternative positioning for supervised play.

#### The PEO Model, Occupational Therapists, and Positioning of Infants

That occupational therapists should have a role in addressing this public health issue is supported by looking at the potential role occupational therapists can play in client education. The current study centered on PCPs' responses to why and how they educate caregivers about positioning. The PEO model developed by Law and colleagues (Law, Cooper, et al., 1996) can be used to frame the transactions between caregivers and PCPs. This model defines the person and their various occupational roles, within the environmental context. Law, Cooper, et al. (1996) acknowledge that the person, environment, and occupation component of PEO co-exist, morph, and evolve over time; this model is dynamic. Within this model the potential ramifications of infant positioning education for caregivers can be illustrated by looking at the interactions between the



environment, person, and occupation components surrounding the issues related to infant positioning. While within the PEO model the infant, the caregiver, or the PCP could each be viewed as ‘person’, for simplicity the following discussion will focus on the PCP and the caregiver separately, each as representative of the person component, with their respective (yet overlapping and intersecting) environments and occupations. This model was depicted in Figure 1. Recall, the areas of overlap symbolizes occupational performance; the more overlap, the better the occupational performance.

*The Environment: Influencing and being Influenced by the Caregiver*

The environment component of the PEO model includes the physical, cultural, and social environment in which the person engages in occupation, and which influence the expression of occupation. Context, which can be viewed as the backdrop to the environment, setting the stage for how the environment is perceived and then received has great potential to influence the choices, in this case, actions for caregiving. By educating caregivers about how to keep their infants safe, and how to promote optimal development while addressing issues related to mortality and mobility, the PCPs are promoting optimal health and wellness for the infant. Law, Cooper, et al. (1996) note that each person “calls upon a set of skills, both learned and innate, in order to engage in occupational performance (p. 16)”.

For caregivers in this study, the environment includes their PCP, but also includes others in the environment that may have their own opinions to offer on positioning for sleep and play. For instance, a mother or mother-in-law may believe that infants sleep better when placed prone and urge a caregiver to ignore the recommendation of the PCP.

These conflicting sources of environmental input serve as opposing environmental stressors for the caregiver. One example, mentioned earlier, was the study by Willinger, Ko, et al. (2000). These investigators found that the presence of a grandmother in the house coincided with a two-fold increase in prone sleep positioning for infants in one select demographic population. It is likely cultural and social influences had a role in how these infants were positioned; the grandmother provided powerful cultural and social influences. Occupational therapists have the potential to be positive, viable, influential environmental factors of the caregivers about issues related to infant positioning. Currently occupational therapists work with infants and their caregivers as environmental influences after concerns of plagiocephaly, torticollis, and/or developmental delays arise. In the future occupational therapists could impact infant caregivers' environments with preemptive education about positioning recommendations for sleep and awake time.

In addition, behavior and temperament of the infant add another dimension to the environment of the caregiver; if the infant is calm and alert in supine when awake, but fussy when in supervised prone, the caregiver may choose to avoid prone positioning altogether. Potential avoidance of positioning other than supine may have long-term effects on the occupation of the infant as a learning, growing, person, as the potential risks of plagiocephaly or developmental delays would increase with sole supine positioning (Davis, Moon, Sachs, & Ottolini, 1998; Littlefield, Kelly, Pomatto, & Beals, 1999; Peitsch, Keefer, LaBrie, & Mulliken, 2002). Also, the infant would not receive benefits of supine, prone, and side lying positioning that were discussed earlier as a

variety of positioning has an affect on the infant's interaction with their physical, social, and emotional environment.

Lawton (1986) wrote about environmental press, defining press as forces in the environment that provoke reactions or responses. As can be seen by the examples above, environmental press can come from infants' health and temperament, demands from family, social and cultural environment, and the PCPs. In the current study these forces are among those that may influence caregivers parenting decisions; including decisions about positioning.

### *Caregiver as the Person*

The person in PEO is driven by several intrinsic and cognitive motivators unique to individuals, in this case, unique to individual caregivers. One such motivator is the internal belief system and personal values of the caregiver. The caregivers' belief that their behaviors can influence the environment in a meaningful way, in this case, the physical environment of the infant in positioning for sleep and awake time, is crucial for optimal carryover in positioning recommendations. This belief system may be influenced by the caregivers' ability to learn and carryover recommendations for positioning. This is what Law, Cooper et al. (1996) refer to as the "cognitive aptitude (p. 16)." Further, the caregivers' internal values, including respect for and receptiveness to education and recommendations from the PCP, also affect learning. Ideally, the caregiver, with education from the PCP or other health care providers (for example, occupational therapists), may feel empowered to provide the optimal environment for their infants' optimal development. This potential for a sense of empowerment relates to what Law,

Cooper, et al. (1996) refer to as the self-concept. Occupational therapists have the potential to influence the self-concept of the caregiver. By arming the caregiver with education about how to provide optimal care (including positioning for sleep and play) for their infant, therapists can instill confidence in the caregiver that they are armed with knowledge of how to be an informed caregiver.

### *Caregiving as the Occupation*

When identifying the caregiver as the person component of the PEO model, with caregiving as the occupation, a review of how Law, Cooper et al. (1996) define occupation is helpful: “Occupations are defined as those clusters of activities and tasks in which the person engages in order to meet his/her intrinsic needs for self-maintenance, expression, and fulfillment (p. 16)”. Clusters of activities and tasks that relate to infant caregiving specific to the current study include interacting and positioning the infant for awake time, play, and for sleep.

Figure 4 depicts the PEO model when there is moderate overlap between spheres, indicating a moderate level of synchronicity between components, and high occupational performance.

Caregiving is an occupation that includes basic care tasks for the infant, including positioning for sleep and awake time. Once again, occupational therapists have tremendous potential to positively influence the occupational performance of the caregiver for the occupation of caregiving with preventative education about positioning; occupational therapists can impact the environment of the caregivers. A positive

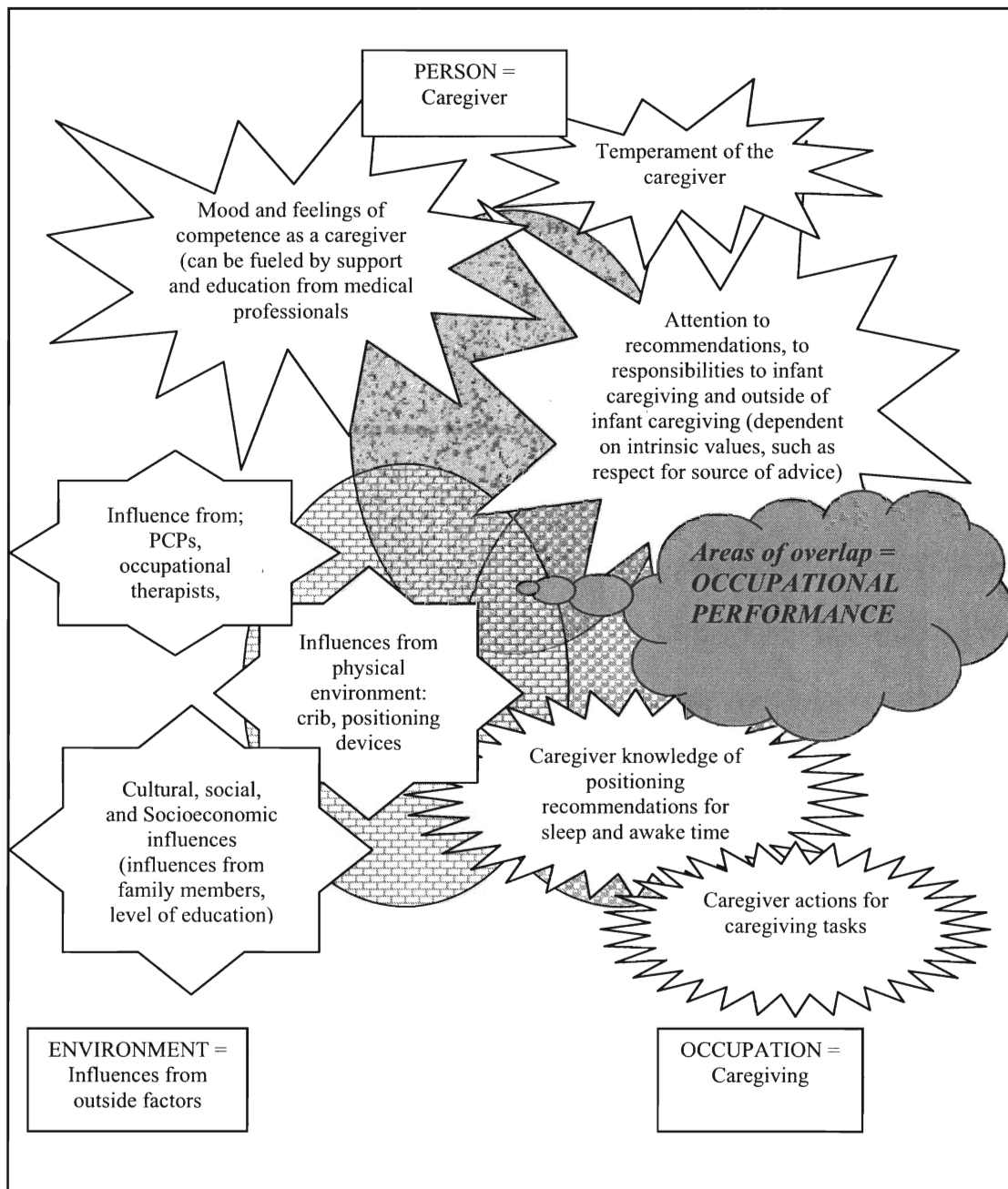


Figure 4

*PEO Model and Caregiver as the Person*

influence via education in the caregivers' environment can impact how occupational performance is executed; how caregiving as the occupation is carried out.

Further, occupational therapists can team up with PCPs to further facilitate this education. However, in order to reflect on this option, the PCP as the person will be explored and discussed in relation to the literature and the results of this inquiry, to gain greater understanding of influences to and from the PCP in regard to positioning.

*Environments Influencing and being Influenced by the PCP*

PCPs in this study responded to inquiry about specific and general environmental influences on how and why they provide education about positioning for infants. The PCP as person has potential to both impact and be impacted by the caregiver as the person.

There are several examples from this current study of how the environment may influence the PCP. As discussed earlier, the current study demonstrates a relationship between practice site, and the frequency that positioning education for sleep is carried out. Results suggested that the work environment of the PCP was a factor. Further study would be required to understand specific aspects of the environment of the family practice offices (versus the pediatrician offices) were behind the differences in frequency reported during this inquiry.

Further, as discussed, the infant caregivers have potential to serve as environmental influences on how and why PCPs educate about positioning. In this current study, only 18.2% of the participants (n=12) indicated they are influenced by caregiver's reactions or concerns when they make recommendations for positioning infants for both sleep and awake time. Other specific environmental influences from this inquiry include; professional organizations, concerns about SIDS, and developmental, or

infant-age related criteria. These environmental influences guide the practice and decisions for the positioning education for caregivers.

Examples of how the PCPs may influence the environment of their practice and that of the caregiver as the person include the methods chosen for education. How infant caregivers are educated about positioning was reflected in the inquiry for the present study, in which the majority of PCPs used verbal education alone for positioning rather than a combination of methods. Perhaps expansion using other types of education (such as websites) could help with carryover, as how PCPs choose to educate caregivers has potential to impact the environment of the caregivers (with potential to affect their skills through different learning modalities).

Awareness about the influence of environment on caregiving is essential to provide the most effective intervention for caregiving education, and to promote the most carryover. Earlier, Dr. T described how she invites influential family members, in her experience, mother-in-laws, to well baby visits in order to acknowledge and address educating infant caregivers effectively (Choffin, 2005). By extending an invitation to influential family members, Dr. T is demonstrating respect for other potential environmental influences on both caregiving and on her education of the caregiver by PCPs.

#### *Primary Care Provider as the Person*

As is true for caregivers, the PCP has several motivators influencing how they provide skilled medical intervention and carry out the education of infant caregivers. The PCP's internal values and self-concept may influence how and why they educate infant

caregivers about sleep positioning; if the PCPs make assumptions that positioning education is not necessary or important, this has great potential to impact the health and well being of the infant. Further, the PCP has great potential to impact the caregiver; the PCP can also be seen as part of the caregivers' influential environment.

*Educating Caregivers as an Occupation for Primary Care Providers*

The focus of this inquiry, how and why PCPs educate infant caregivers about positioning, is an example of how an occupation for PCPs is that of an educator. As was illustrated in the example of the caregiving occupation, each person has the opportunity to engage in multiple occupations throughout their lifespan. The PCPs' role as an educator to infant caregivers is a formidable one; in addition to evaluating the growing infant's health and well-being, they are responsible for educating caregivers about the basics of infant care. Examples of some of this basic education may include feeding the infant, addressing how the caregiver should monitor the infants intake (bottle or breast) and output (urinating, bowel movements), issues related to infants' sleep and awake cycles, infants' crying, etcetera. The environmental press for this occupation as educator is for optimal outcomes for the health and well-being of the infant. With this in mind, it was not surprising that the majority of PCPs are engaging in sleep positioning education for SIDS prevention. In the end, it was understandable that fewer PCPs engaged the same frequency of awake or positioning in device education; the outside influences, such as policy from the AAP, or information in professional journals, are insufficient at present to support the need for such education.



### Limitations

Analysis and comprehension of the results of this study must be reviewed in light of the study limitations. The confined geographic representation of the sample, and relatively small sample size, limits generalizability of findings to the broader population of PCPs. In retrospect, the design of survey questions limited the ability to examine the data for correlation relationships.

Further, although the study endeavored to include PCPs with a variety of backgrounds, a larger number of participants with NP and PA credentials would have allowed for further investigation into how clinicians with different educational backgrounds provide caregiver education.

A future version of the same study would also involve rewording of some of the survey questions. The current design allowed for multiple responses to individual questions, thus limiting statistical analysis. Given the current state of knowledge in this area this was an appropriate design. However, in the future survey questions could be constructed to include only the most frequent responses obtained here, allowing for higher level analyses.

### Implications for Future Research

While the exact reasons behind why some PCPs do not educate infant caregivers about positioning for sleep, awake time, and positioning in devices are not known, it is likely that there are explanations for these omissions rather than intentional exclusion. Examples of potential explanations include the following:

- The PCP may make assumptions that positioning education is unnecessary; perhaps the infant has an older sibling, and the PCP assumes the caregiver is aware of current positioning recommendations.
- The PCP may make assumptions that other professionals, such as nurses in the hospital, are educating caregivers about recommendations for positioning.
- The PCP may be unaware of the probably relationship between positioning and plagiocephaly, torticollis, and developmental milestone achievement.

Awareness of such explanations allows for greater understanding for research and intervention in the complex area of infant positioning.

While this inquiry focused on the why and how PCPs educate infant caregivers about positioning, several related explorations could be interesting to pursue to gain further understanding about the continuously evolving arena of infant positioning. While this quantitative inquiry is one of many steps necessary for gaining understanding about how and why PCPs educate about positioning, more research is needed in order to provide an evidence-base about the education of infant caregivers about positioning for sleep and awake time, and the incidence and significance of plagiocephaly, torticollis, and developmental delays in relation to how the infants are positioned during their first several months of life. This evidence base could be helpful in facilitating understanding and respect of the potential ramifications explored in the review of the literature of how and why infant caregivers are educated about positioning for sleep time, awake time, and time in positioning devices.

Ideas for future inquiry include:

- Investigations using larger sample sizes from different demographic and geographical locations. This will allow more generalizable exploration about the provision of education about positioning during waking hours, and positioning.
- Investigation of relationships between aspects of PCP education and the provision of education to caregivers. While it was planned for the current study, the structure of the survey responses made correlational analyses unfeasible. Additional research could probe relationships between background, training, and current work environment and the provision of education to infant caregivers. This would better define a target audience for PCPs needing more information about positioning of infants during the first year of life. There are many possible reasons as to why a PCP might not provide positioning education to the caregiver of an infant as discussed.
- An intervention- type study with infant caregivers regarding sleep and awake positioning can be carried out by occupational therapists working with infants in the hospital, clinic, or home setting; sleep positioning education can be incorporated into other caregiving education opportunities during therapeutic skilled interventions. The rationales suggested earlier are important to consider during such intervention-type study to shape potential research questions. For example, in case the caregiver was not educated by their PCP about sleep positioning recommendations, the therapist may understand the rationale behind the caregiver's perspective(s) on infant positioning.

- The review of literature indicates that research about implications of how infants are positioned for awake time, whether or not infants “skip” developmental milestones such as crawling, and how it relates (or does not) to long term fine and gross motor skills throughout childhood is weak at best. Future study about how infants are positioned for play/awake time during infancy and the development of their fine and gross motor skills through primary school years and beyond, in large, longitudinal studies, are necessary to explore if how infants are positioned during their first year could have implications for how and why occupational therapists and other healthcare professionals make positioning recommendations for infants;

Future studies involving caregivers of infants that are at increased risk for plagiocephaly could also contribute to the knowledge base that contributes to sound practice. Biggs (2003) lists prenatal risk factors that may predispose some infants to the development and/or progression of severity of plagiocephaly: premature birth, hypotonic muscle disorders, congenital torticollis, and intrauterine constraint. Biggs also notes that there can be various causes of intrauterine constraint, such as in the case of multiple gestation and oligohydramnios (low amniotic fluid). This suggests that some infants should be monitored closely after birth for signs of cranial deformities and neck muscle imbalance, and that their caregivers should be educated about providing supervised varieties of positioning to the rapidly growing infant.

### Implications for Occupational Therapy

There is great potential for occupational therapists to influence the social and medical environment of the caregivers and infants. As was noted earlier, Sanderson, Lohman, and Bramble (2003) define public health as “a system of surveillance and services to a population that are intended to identify and reduce mortality, morbidity, and disability due to illness, injury, and disease (2003, p. 243)”. Occupational therapists could be involved in public health issues, but tend not to be. This is an area in which they have much to offer.

The Occupational Therapy in the Promotion of Health and the Prevention of Disease and Disability Statement (2001) describes and defines the roles of occupational therapy in relation to the prevention of disease and promotion of wellness. There are three levels of prevention, and their potential applications to the current study are discussed below.

#### *Primary Prevention*

Primary prevention involves the use of education much like what is seen with SIDS prevention education. This same approach could be taken with education about supervised awake positioning during the first few months of life, with the goal of preventing potential head and neck deformity (plagiocephaly and torticollis) and developmental delays. Occupational therapists are involved in primary prevention when educating clients and their caregivers about recommendations for checking for pressure points at risk for skin breakdown when donning and doffing splinting devices, and with pressure relief recommendations and techniques for clients that spend extended periods

of time in wheelchairs or in bed. These recommendations are done using temporal guidelines. For example, when a new splint is issued, the therapist may recommend doffing the splint and checking the skin for signs of breakdown every 20 minutes initially. Likewise, for clients with limited mobility, there may be recommendations for pressure relief positioning approximately every 60 minutes, depending on the client's age and health status. The recommendations described by Persing et al. (2003) are a start, but as the context of the environment may differ from caregiver to caregiver, the interpretation of these guidelines can vary greatly also. Increased specificity is one of the first steps to addressing the issue of encouraging caregivers to provide supervised prone positioning and to decrease excessive positioning in devices.

One example of how occupational therapists have gotten involved in primary prevention in the community is with the initiation of "Backpack Awareness Day" where occupational therapy practitioners, researchers, and students across the country provided education in their communities with events to teach about how to properly wear backpacks to decrease the risk of injury (retrieved from the World Wide Web on October 16, 2006 [http://www.promoteot.org/AI\\_BackpackAwareness.html](http://www.promoteot.org/AI_BackpackAwareness.html)). Similar outreach may be successful in the arena of infant positioning. For example, occupational therapists could educate their communities with warnings to consumers about the prolonged use of positioning devices. Such warnings could be made by manufacturers of positioning devices if there is sufficient research to support the warnings, and with advocates like occupational therapists that can identify and initiate skilled intervention

and education in their communities. Another example of primary prevention could be executed is with websites.

### *Occupational Therapists and Websites*

Occupational therapists have the potential to use occupational therapist-created informational websites for preventative and informative education. Upon preliminary review of occupational therapy-related websites, there were several occupational therapy links with online forums for parents. One example is a site developed by an occupational therapist is set up with resources for parents of children with special needs:

<http://www.geocities.com/stinaOTR/> (retrieved from the World Wide Web on September 29, 2006). While the current search could not be said to have been exhaustive, the occupational therapy-anchored websites found were connected to public or private occupational therapy practice sites. There were no occupational therapy sites that were specific to positioning for sleep or play in “typical” infants, and none identified had information that specifically addressed this issue. Occupational therapists should continue to use this form of media for educating infant caregivers about developmental issues, and the results of this study indicate that there is a reason for occupational therapists to include information specific to positioning for both sleep and play in the first year of life. In addition to the other healthcare providers traditionally contributing to websites, occupational therapists could be an invaluable resource for such informational websites secondary to their background and training, as mentioned earlier. The Cranial Technologies website (retrieved from the World Wide Web October 6, 2006 <http://www.cranialtech.com/medicalinfo/tummytime.pdf>) provides a comprehensive

caregiver-friendly brochure of positioning recommendations for infants and reports it was put together by pediatric occupational and physical therapists. However, it is likely that parents will stumble upon this website only when searching for information about plagiocephaly, in other words, after signs or symptoms of a condition has already arisen. The goal of therapists should be to address prevention before there are signs of plagiocephaly or any other issues that could be instigated by positioning choices.

#### *Occupational Therapists and Infant Care Classes*

Occupational therapists could also influence infant caregivers' environment by teaching prenatal infant care classes that could teach parents how to position and interact with their infants for supervised play. These classes could include education about developmental play activities for different developmental periods with the rapidly changing, developing infant.

#### *Occupational Therapists and In-Services*

Occupational therapists could provide in-servicing to PCPs, armed with information about the importance of providing a variety of positioning for infants for optimal growth, health, and development. Another idea would be for therapists to provide PCPs with bite-sized recommendations, such as in the format of one page handouts, to pass on to their clients with recommendations for play and positioning with infants. Occupational therapists could also team up with PCPs to research and education about the risks associated with lack of prone positioning and excessive supine positioning on the impact on development.



### *Secondary Prevention*

Secondary prevention involves early detection and treatment. An example of secondary prevention is when pediatricians and occupational therapists are active in the early identification of plagiocephaly and/or torticollis in infants.

### *Tertiary Prevention*

Tertiary prevention involves treatment that is put in place to stop disease and prevent further disability. Tertiary treatment is what is already being done by occupational therapists at companies like Cranial Technologies, where the therapist evaluates and treats infants with plagiocephaly and/or torticollis.

That occupational therapists are not involved to any great extent in the public health issue addressed by this study is suggested by the fact that very few PCPs (n=2) reported being influenced by occupational or physical therapists in relation to what they told caregivers about positioning for sleep time. While just over 27% (n=18) of participants reported being influenced by occupational or physical therapists about how they educate infant caregivers about positioning for awake time, it is likely that influences from therapists comes after issues that require skilled intervention arise, since services typically are initiated upon physical or occupational dysfunction. While it would be ideal for occupational therapists to provide preventative education prior to any injury, illness, or condition that would warrant skilled assessment and intervention, it is unlikely that preventative intervention would be covered under the current medical structuring in the United States. As examples of the current medical structuring for reimbursement in the United States, the Medicare, Medicaid, Blue Cross/Blue Shield, and Cigna

informational websites were searched for information about occupational therapy and preventative care; none of these sites included coverage for preventative care from occupational therapy (Retrieved from the World Wide Web from <http://www.medicare.gov/Health/Overview.asp>; <http://www.cms.hhs.gov/home/medicaid.asp>; <http://www.bcbs.com/>; and <http://www.cigna.com/health/>). Examples of where preventative or maintenance care is not covered include the following:

- Home health occupational therapy cannot initiate treatment for clients under Medicare Part A unless physical therapy, speech therapy, or nursing evaluates the client and sees a need (in other words, a perceived functional deficit).
- Hospital-based occupational therapists bill using CPT codes (medical code) and a treatment code; there is not a code for preventative care for billing.

Occupational therapists could have a key influence on the environment of caregivers and PCPs from many perspectives. Their knowledge of anatomy, including development and the impact of how infants are positioned on their wellness and development, as well as holistic understanding and respect of infant states of consciousness and respect for infant's signs of over stimulation (for example, hiccups, yawning, crying). Occupational therapists are also aware of how to provide skilled therapeutic intervention. Their holistic approach includes the training to listen to the infant caregivers, to incorporate recommendations for infant positioning in ways that are both digestible and generalizable to the context of the infants' home environment. Occupational therapists can expand upon the methods infant caregivers are taught

information about caregiving. Examples of how occupational therapists can accomplish this include using websites, and providing educational classes to caregivers and PCPs. Occupational therapists' aerial view of the complexity of occupation could play a vital role in educating infant caregivers- and PCPs -, while instilling a sense of meaning in the education about the importance of providing a variety of positions for play within the complex, evolving occupation of caregiving.

### Conclusions

Overall, as a collective group, the vast majority of pediatric PCPs in this study are educating infant caregivers about sleep positioning, with all using verbal recommendations during well baby check ups. PCPs educate caregivers about awake positioning somewhat less often. PCPs are not educating caregivers about the use of infant positioning devices to any substantial extent. This is interesting since infants spend both sleep and awake time in these devices. Biggs (2003), a family medicine physician recommends PCPs educate about the prevention of plagiocephaly during the routine 2 week old check-ups, and provide a thorough assessment of the infant's head shape and facial asymmetry at the 2 month old check-up. This would be a welcome standard of care across the board.

Seven key potential influences emerged from analysis and discussion of the data as illustrated in Figure 5. These eight influences are examples of what could impact how and why PCPs educate infant caregivers about sleep and awake time.

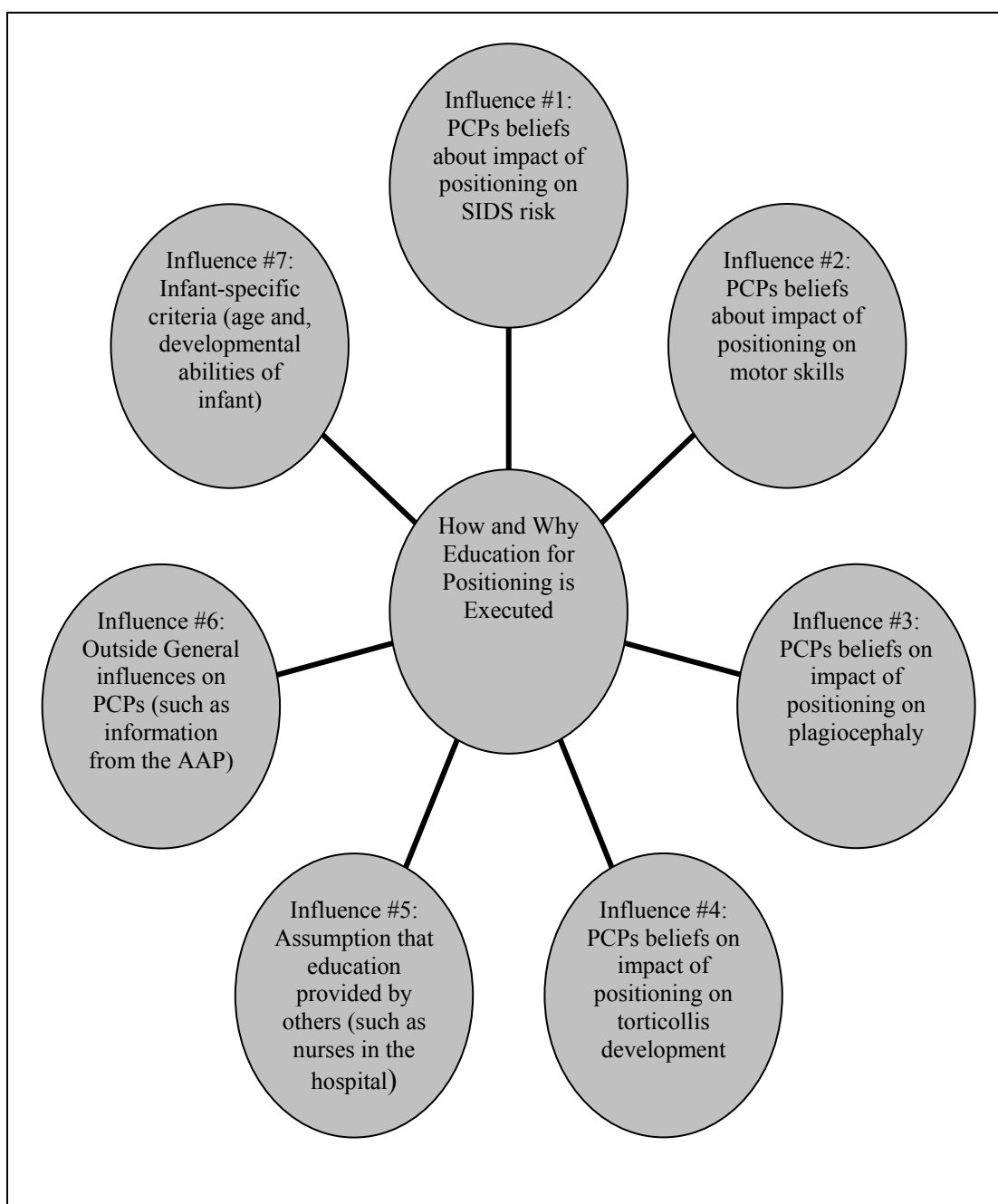


Figure 5

*Potential Influences on How and Why Education for Positioning is Executed*

Occupational therapists can have a role in the education of caregivers about sleep and awake positioning. One potential avenue would be for occupational therapists to

create and lead pre-natal classes about infant positioning, and the role of caregiving, including education about play and developmental milestones to look for in infants. Occupational therapists may also influence PCPs about the impact of positioning for awake time and plagiocephaly, torticollis, and motor skills with education.

There are many transactional interactions as described and defined in the scope of the PEO model which has a direct impact on occupational performance. Knowledge of the multi-faceted issues surrounding infant positioning is crucial for optimal skilled intervention. Infant positioning for prevention of SIDS, prevention or early intervention with plagiocephaly, torticollis, and the promotion of optimal development may be promising areas for occupational therapy to intervene with skilled therapeutic play interventions with infant caregivers.

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## APPENDICES

## APPENDIX A

Hello! Thank you so much for your assistance...If you could please take the survey as if you were a pediatric PCP, writing down the start/end times (or just the total time it took to complete the survey).

Also, if you could please consider the following questions *after* you take the survey (to avoid bias):

- Were the instructions clear?
- Was it clear when only one answer is indicated vs. when multiple answers were allowed?
- Does the wording need to be changed in any way?
- Was the response set sufficient (anything missing?)
- Aesthetics? (including graphic on front)

I appreciate your help. I am an Occupational Therapist pursuing my post-professional master's degree in Occupational Therapy. This survey will be used for my study that I will be conducting in the near future. If you need to reach me, my phone number is -----  
My e-mail address is -----that will be changing in the very near future  
(I do not have the new address/account set-up yet). I will forward my new contact e-mail address onto Nancy Dulin as soon as it is established.

Thank you again!

Amy Choffin, OTR/L

## APPENDIX B

## PROPOSED SCRIPT FOR INVESTIGATOR

Hi, my name is Amy Choffin. Thank you all so much for coming today. Please help yourself to the food. I appreciate you all being here, and want to tell you a little about myself and this survey before you begin. I am an occupational therapist, and I am doing this study as part of my fulfillment towards my post-professional master's degree in occupational therapy at Virginia Commonwealth University. The survey that is in front of you was approved by my thesis committee, and the Virginia Commonwealth University Institutional Review Board. The survey asks for information related to education of caregivers of well babies one year of age and younger. While there is no direct benefit to you for participating, completion of this survey may result in increased in the awareness of the topics in the survey, which may benefit your patients. I realize that you are busy professionals. I have opted to distribute this survey in person and to provide lunch/snack as a way of increasing the response rate for the survey and showing my appreciation of your participation. This study has been exempted from requiring you to fill out an "informed consent" form. Your consent to participate in this study is implied by your voluntary completion of the survey. While I appreciate any input you can provide on this questionnaire, I want to make sure you all know that you are under no obligation to complete the survey. You may:

- Leave at any time
- Skip any questions you do not wish to answer

- Feel free to ask me any questions about the survey, the study or the VCU IRB approval.

This survey contains 26 short answer questions and should take about 10 minutes to complete. There is no personal identifying information on any survey; the results will be reported as aggregated data. Your name and practice name will not be reported in any published results. And once again, thank you so much for participating.

## APPENDIX C



Thank you for agreeing to allow me to come to your office to present my project, *An Exploration of How and Why Primary Care Providers Educate Infant Caregivers about Positioning*, to the Primary Care Providers (PCPs). I plan to come on \_\_\_\_\_ and will bring a snack for the participants in appreciation of their time. All PCPs available will be invited to attend a short overview of the project, and to complete a written survey. I anticipate that this will require no more than 15 minutes of their time.

This project has been qualified for exemption according to CFR 46.101(b) by the VCU IRB Panel C. A component of this approval requires that I obtain permission in writing to conduct this study at your office. Your signature on this letter indicates that you are aware of the study, and have given me permission to come to the office to present the study. Your signature and representation in no way commits the Primary Care Providers (physicians, physician assistants, or nurse practitioners) to participate in this study

In the future, you may have questions about this study. If you have any questions, you may contact the student investigator at:

Amy Choffin, OTR/L

-----

\_\_\_\_\_  
You may also contact the principal investigator at:  
Shelly J Lane, PhD, OTR/L, FAOTA  
Professor and Chair, Department of Occupational Therapy  
Assistant Dean of Research, SAHP  
Virginia Commonwealth University  
P.O. Box 980008  
Richmond, VA 23298  
804-828-2219 (office phone)  
804-828-0782 (office fax)  
[sjlane@vcu.edu](mailto:sjlane@vcu.edu)

\_\_\_\_\_  
Please print your name and title here:

\_\_\_\_\_  
Please sign your name here:

\_\_\_\_\_

## APPENDIX D

Amendment to VCU IRB # HM10108

This is a request for approval to amend Section 7 of the IRB Research Synopsis, Part VIII, Research Method and Design that has been submitted and approved by Virginia Commonwealth University's Institutional Review Board.

While the intent of the student investigator was to collect the survey data while being present for all approved practices, the student investigator has received inconsistent feedback from practice sites about this approach. The reason the student investigator is striving for face-to-face data collection is because there may be value in being physically present in case there are any questions of concerns. The student investigator also has hopes of receiving a higher response rate from the recruited clinicians with face-to-face recruitment.

During the initial phases of face-to-face recruitment, there have been some facilities that described the reviewed survey and instructions as easy to comprehend and therefore do not need or want there to be a specific date, time, or place to be issued for the data collection. In order to gather as much data as possible, I must comply with the requests of specific offices.

At the suggestion of one office manager, the student investigator will be flexible with the types of time-compensation offered to different practices, within reason. One office had a specific request for \$5 Starbucks gift cards to accompany each survey, citing that participants in the office may see this as fair compensation for their time. Meanwhile, some of the other offices recruited are still interested in the student investigator's offer of a lunch tray or snacks. Therefore, this amendment outlines a new flexibility in how the participants will fill out the survey, either with the student investigator present, or on their own time. This amendment also states that compensation for participation in the survey may include any of the following: lunch, snacks, or a \$5 Starbucks gift card.

Thank you so much for your attention to the above,

Amy Choffin, OTR/L

## APPENDIX E

Thank you for agreeing to allow me to come to your office to present my project, *An Exploration of How and Why Primary Care Providers Educate Infant Caregivers about Positioning*, to the Primary Care Providers (PCPs). I plan to come on \_\_\_\_\_ and will bring a snack or Starbucks cards for the participants in appreciation of their time. All PCPs in your office will be invited to complete a written survey. I anticipate that this will require no more than 10 minutes of their time. I will schedule a follow-up date to pick up the completed surveys with you. If more time is needed to give the providers in your office, you can reach me at the contact information below.

This project has been qualified for exemption according to CFR 46.101(b) by the VCU IRB Panel C. A component of this approval requires that I obtain permission in writing to conduct this study at your office. Your signature on this letter indicates that you are aware of the study, and have given me permission to come to the office to present the study. Your signature and representation in no way commits the Primary Care Providers (physicians, physician assistants, or nurse practitioners) to participate in this study

In the future, you may have questions about this study. If you have any questions, you may contact the student investigator at:

Amy Choffin, OTR/L  
-----

You may also contact the principal investigator at:

Shelly J Lane, PhD, OTR/L, FAOTA  
Professor and Chair, Department of Occupational Therapy  
Assistant Dean of Research, SAHP  
Virginia Commonwealth University  
P.O. Box 980008  
Richmond, VA 23298  
804-828-2219 (office phone)  
804-828-0782 (office fax)  
[sjlane@vcu.edu](mailto:sjlane@vcu.edu)

Please print your name and title here:

Please sign your name here:

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## APPENDIX F

## QUESTIONNAIRE

**An Exploration of How and Why Primary Care Providers Educate  
Infant Caregivers about Positioning**

By Amy Choffin, OTR/L



Thank you so much for participating in this study. All questions on this survey are in reference to healthy, full-term infants and babies under one year of age and their caregivers and/or caregivers. The information you provide will contribute to the small, but growing body of knowledge about the positioning of babies for sleep and for supervised play. The survey contains 26 questions and should take you no longer than 10 minutes to complete.

This study has been reviewed by the Virginia Commonwealth University (VCU) Institutional Review Board (IRB). Voluntary completion of this survey indicates your awareness of your rights as a human subject, and the potential risks and benefits of this study. This is not a treatment study. There is a very slight chance that participants may find the questions uncomfortable to answer, if they feel their professional behavior is being questioned. You may skip any question you are uncomfortable answering. It is possible that participants may experience indirect benefit to their clinical practice from participation in this study as the questions may provoke the participants to think more about infant positioning after completing the questionnaire. Your answers will be kept confidential; no personal or identifying information about individual participants will be shared in the analysis or publication of the data. Data will be kept in a locked cabinet until this study is completed, and will then be destroyed.

*Amy Choffin, OTR/L, Student Investigator**Dr. Shelly Lane, Thesis Advisor  
Principal Investigator*

Department of Occupational Therapy,, Virginia Commonwealth University  
1000 E. Marshall St.  
PO Box 980008  
Richmond, VA 23298-0008

**Please complete the following questions by checking the box associated with your response. In some questions you will be asked to choose one answer, in other questions you will be asked to choose all that apply.**

**1. Are you a:**

- 1. Pediatrician*
- 2. Family Practice Physician*
- 3. Physician's Assistant in a Pediatrician's office*
- 4. Physician's Assistant in a Family Practice*
- 5. Pediatric Nurse Practitioner (PNP)*
- 6. Family Medicine Nurse Practitioner (FNP)*
- 7. Other* \_\_\_\_\_

**2. Are you board certified?**

- 1. Yes*
- 2. No*

**3. Please indicate when you completed your training to work with infants (i.e. completed final clinical, or residency):**

- 1. Before 1960*
- 2. 1961-1970*
- 3. 1971-1980*
- 4. 1981-1985*
- 5. 1986-1991*
- 6. 1992-1996*
- 7. 1996-present*



### **Positioning for Sleep**

**4. What percentage of the time would you say that you discuss infant positioning for sleep with caregivers who you see at routine well baby checkups?**

- 1. Never (0%)*
- 2. Rarely (<10%)*
- 3. Occasionally (10% to <30%)*
- 4. Sometimes (30% to <50%)*
- 5. Often (50% to <70%)*
- 6. Most of the time (70% to <90%)*
- 7. Almost all of the time (90% to <100%)*
- 8. Always (100%)*

**If you answered “Never” to question #4, please answer question #5. Otherwise, proceed to question #6.**

**5. If you do not routinely educate caregivers about sleep positioning but someone else in your office does, who has this responsibility?**

- 1. Nurse*
- 2. Nurse Practitioner*
- 3. Physician’s Assistant*
- 4. Other \_\_\_\_\_*

**6. While Sudden Infant Death Syndrome (SIDS) is stated to be a disease of unknown cause during the first year of life, the American Academy of Pediatrics (AAP) October 2005 policy statement does not outline specifics about *when it is* okay for infants under one year of age to begin to sleep prone. Which factors help you to determine if/when prone positioning for sleep is permissible for infants under one year old? (check all that apply)**

- 1. The age of the infant*
- 2. If the infant can roll supine to prone*
- 3. If the infant can roll prone to supine*
- 4. If the infant can turn its head from side to side in prone*
- 5. If the infant can lift its head when in prone*
- 6. If the caregivers believe it is best for their infant*
- 7. If there is no family history of SIDS*
- 8. I do not advocate for any prone sleep positioning in the first year of life*
- 9. Other*

**7. Using the numbers of your responses to question #6, please rank order the 3 top reasons that most influence your educational practices with caregivers about prone sleep positioning, with #1 being your top reason.**

#1                      #2                      #3

**8. At what age do you inform caregivers that *prone* positioning is permissible for sleep?**

1. *At birth*
2. *2 weeks of age*
3. *4 weeks of age*
4. *2 months of age*
5. *4 months of age*
6. *6 months of age*
7. *Not for the first year of life.*
8. *Other* \_\_\_\_\_

**9. Which of the following is influential to how you educate infant caregivers about positioning infants for sleep (please check all that apply)?**

1. *Sleep positioning is not typically discussed with the caregivers (n/a)*
2. *Clinical experience*
3. *Continuing education courses*
4. *Professional conferences/meetings*
5. *Professional journals*
6. *Guidelines from a professional organization (e.g. AAP)*
7. *Caregivers' reactions/concerns*
8. *Professional colleagues (e.g. MDs, PAs)*
9. *Pediatric education/training*
10. *Influence from occupational or physical therapists*
11. *Concern about SIDS*
12. *Other* \_\_\_\_\_

**10. Using the numbers of your responses to question #9, please rank order the 3 top reasons that most influence your educational practices with caregivers with #1 being your top reason.**

#1                      #2                      #3

**11. As a general rule, *when* do you routinely educate infant caregivers about recommendations for *sleep* positioning (please check all that apply)?**

1. *Upon initial visit in the hospital*
2. *During the initial office visit*
3. *During the first month of life*
4. *At the two month check up*
5. *At the four month check-up*
6. *At the six month check up*
7. *At the nine-month check up*
8. *Continuously, for the first year of the child's life*
9. *I do not routinely educate about sleep positioning, but my answer reflects when someone else in my office typically educates caregivers about this.*
10. *Other* \_\_\_\_\_

**12. By what means do you provide education to caregivers about *sleep* positioning recommendations (check all that apply):**

1. *Oral recommendations*
2. *Handout or pamphlet*
3. *Website recommendations*
4. *Other* \_\_\_\_\_
5. *I do not routinely educate about sleep positioning, but my answer reflects how someone else in my office typically educates caregivers about this.*

### **Positioning for Waking Hours**

**13. What percentage of the time would you say that you discuss positioning during the hours that infants are *awake* with caregivers who you see at routine well baby checkups?**

1. *Never (0%)*
2. *Rarely (<10%)*
3. *Occasionally (10% to <30%)*
4. *Sometimes (30% to <50%)*
5. *Often (50% to <70%)*
6. *Most of the time (70% to <90%)*
7. *Almost all of the time (90% to <100%)*
8. *Always (100%)*

**14. If you do not routinely educate caregivers about awake/play positioning but someone else in your office does, who has this responsibility?**

1. Nurse
2. Nurse Practitioner
3. Physician's Assistant
4. Other \_\_\_\_\_

**15. When educating caregivers or asked by them for advice, which of the following positions do you recommend to caregivers of infants under 4 months about the infants' position for awake time (please check all that apply):**

1. Supine
2. Prone
3. Side lying

**16. As a general rule, *when* do you routinely educate infant caregivers about specific recommendations for *awake* positioning (please read all choices and check all that apply)?**

1. *This is not routinely discussed.*
2. *Upon initial visit in the hospital*
3. *During the initial office visit*
4. *During the first month of life*
5. *At the two month check up*
6. *At the four month check-up*
7. *At the six month check up*
8. *At the nine-month check up*
9. *Continuously, for the first year of the child's life*
10. *I do not routinely educate about sleep positioning, but my answer reflects when someone else in my office typically educates caregivers about this.*
11. Other \_\_\_\_\_

**17. Which of the following have influenced how you educate infant caregivers about positioning infants during their *awake* time (please check all that apply)?**

1. *Awake positioning is not typically discussed with the caregivers (n/a)*
2. *Clinical experience*
3. *Continuing education courses*
4. *Professional conferences/meetings*
5. *Professional journals*
6. *Guidelines from a professional organization (AAP)*
7. *Caregivers' reactions/concerns*
8. *Professional colleagues (MDs, PAs)*
9. *Pediatric education/training*
10. *Influence from occupational or physical therapists*
11. *Concern about the possible relationship between supine positioning and plagiocephaly and torticollis*
12. *Concern about the possible relationship between prone positioning and motor development (e.g., upper body strength)*
13. *Concern that the infant may spend an excessive amount of time in car seats, infant carriers, swings or bouncy seats*
14. *Concerns about SIDS*
15. *Other* \_\_\_\_\_

**18. Using the numbers of your responses to question #17, please rank order the 3 top reasons that most influence your educational practices with caregivers with #1 being your top reason.**

#1                      #2                      #3

**19. Do you ever educate caregivers of infants and children less than 1 year of age about tummy time for playtime?**

1. *Yes (please proceed to question 21)*
2. *No*

**20. Why do you *not* provide education about tummy time for infants (please check all that apply)?**

1. *Lack of evidence*
2. *Concerned about SIDS risks*
3. *Limited visit time*
4. *Other* \_\_\_\_\_

**21. Under which of the following circumstances do you educate about supervised prone positioning (please check all that apply):**

1. *Routinely in all cases*
2. *When asked by the caregiver about positioning for waking hours*
3. *When evidence of plagiocephaly is present*
4. *When evidence of torticollis is present*
5. *When there is evidence of developmental delays*
6. *When there is evidence of risk for plagiocephaly, torticollis, or motor delays*
7. *Other* \_\_\_\_\_

**22. At what age do you feel as though it is safe to place the awake, supervised infant in prone for play?**

1. *At birth*
2. *2 weeks of age*
3. *4 weeks of age*
4. *2 months of age*
5. *4 months of age*
6. *6 months of age*
7. *Not for the first year of life.*
8. *It depends on the infant's development (for example, if the infant is able to lift and turn it's head)*
9. *Other*

**23. What best describes *how* you provide education to caregivers of children under 1 year old about *awake (or play)* positioning recommendations (check all that apply):**

1. *Oral recommendations*
2. *Handout or pamphlet*
3. *Website recommendations*
4. *Other* \_\_\_\_\_
5. *I do not routinely educate about awake positioning, but my answer reflects how someone else in my office typically educates caregivers about this.*

**24. What percentage of the time would you say that you discuss with caregivers, how much time (per day) infants spend in infant carriers, bouncy seats, or infant swings at routine well baby checkups?**

- 1. Never (0%) (skip to question # 26)*
- 2. Rarely (<10%)*
- 3. Occasionally (10% to <30%)*
- 4. Sometimes (30% to <50%)*
- 5. Often (50% to <70%)*
- 6. Most of the time (70% to <90%)*
- 7. Almost all of the time (90% to <100%)*
- 8. Always (100%)*

**25. If you *do* discuss how much time per day infants are spent positioned in infant carriers, bouncy seats, or infant swings, which of the following describe *why* you discuss this with caregivers? (check all that apply)**

- 1. Concerns about plagiocephaly*
- 2. Concerns about torticollis*
- 3. Concerns about motor skill development*
- 4. Other \_\_\_\_\_*

**26. Using the numbers of your responses to question #25, please rank order the 3 top reasons that most influence your educational practices with caregivers with #1 being your top reason.**

#1                      #2                      #3

***Please use this page for any additional comments you may have for the investigators concerning the positioning of infants for sleep and wake times.***

## APPENDIX G



**CITI TRAINING INFORMATION****Monday, November 7, 2005****CITI Course Completion Record for Amy Choffin**

To whom it may concern:

On 1/21/2005, *Amy Choffin* (username=amychoffin) completed all *CITI Program* requirements for the *Basic CITI* Course in The Protection of Human Research Subjects.

**Learner Institution:** *Virginia Commonwealth University*

**Learner Group:** *Biomedical*

**Learner Group Description:** *This course is suitable for investigtors and staff conducting BIOMEDICAL RESEARCH with human subjects. Unless previously completed you **MUST** take the Basic Course.*

**Contact Information:**

Department: Occupational Therapy

Which course do you plan to take?: Social & Behavioral Investigator Course Only

Role in human subjects research: Student Researcher

Mailing Address:

Office Phone:

Home Phone:

**The Required Modules for  
*Biomedical* are:**

	<b>Date completed</b>
Introduction	01/18/05
History and Ethical Principles	01/18/05
Basic Institutional Review Board (IRB) Regulations and Review Process	01/18/05
Informed Consent	01/18/05
Social and Behavioral Research for Biomedical Researchers	01/18/05
Records-Based Research	01/18/05
Genetic Research in Human Populations	01/18/05
Research With Protected Populations - Vulnerable Subjects: An Overview	01/19/05
Vulnerable Subjects- Research With Prisoners	01/19/05
Vulnerable Subjects- Research Involving Minors	01/20/05
Vulnerable Subjects- Research Involving Pregnant Women and Fetuses in Utero	01/20/05
Group Harms:Research With Culturally or Medically Vulnerable Groups	01/20/05

FDA-Regulated Research	01/20/05
HIPAA and Human Subjects Research	01/20/05
Hot Topics	01/20/05
Conflicts of Interest in Research Involving Human Subjects	01/21/05
Virginia Commonwealth University	01/21/05

**For this Completion Report to be valid, the learner listed above must be affiliated with a CITI participating institution. Falsified information and unauthorized use of the CITI course site is unethical, and may be considered scientific misconduct by your institution.**

Paul Braunschweiger Ph.D.  
Professor, University of Miami  
Director Office of Research Education  
CITI Course Coordinator

**CR# 69924**

## APPENDIX H

## STUDY ON BABY POSITIONING

An Exploration of How and Why Primary Care Providers Educate Infant Caregivers about Positioning



Nurse Practitioners, Physician Assistants, and Physicians

Caring for infants less than one year old **NEEDED** for participation in this 10 minute survey.

DATES/TIMES:

LOCATION:

Snack will be provided.

Contact:  
Amy Choffin, OTR/L

## APPENDIX I

## LIST OF FREQUENTLY USED ABBREVIATIONS

1. American Academy of Pediatrics (AAP)
2. American Academy of Pediatrics Task Force (AAP Task Force)
3. Institutional Review Board (IRB)
4. Neonatal Intensive Care Unit (NICU)
5. Nurse Practitioner (NP)
6. Occupational therapy/Occupational therapist (OT)
7. Person-Environment-Occupation Model (PEO)
8. Physician's Assistant (PA)
9. Primary Care Provider (PCP)
10. Sudden Infant Death Syndrome (SIDS)
11. Virginia Commonwealth University (VCU)

## VITA

Amy Choffin was born in Hartford, Connecticut, but grew up in a suburb of Buffalo, New York. She is married to Matthew Choffin and together they have two little girls. They have resided in Charlotte, North Carolina since 1996.

Amy is currently a graduate student at Virginia Commonwealth University. She graduated from Williamsville East High School in 1992. Amy received a Bachelors of Science degree from the University at Buffalo in Occupational Therapy, graduating Cum Laude, in 1996.

Amy is currently employed with Presbyterian Healthcare System in Charlotte, North Carolina, working per diem throughout the hospital system in various settings. Amy has also worked as an occupational therapist in the Carolinas Healthcare System, at the Charlotte Institute of Rehabilitation.